NEPTUNE
TECHNOLOGY GROUP

N_SIGHT® Software Suite New Customer Guide

(Includes N_SIGHT and N_SIGHT PLUS)

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ARB® UTILITY MANAGEMENT SYSTEMS™

N_SIGHT® Software Suite New Customer Guide

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N_SIGHT Software Suite
New Customer Guide
Literature No. NC N_SIGHT 09.17

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Chapter 1: Introduction

The *N_SIGHT® Software Suite New Customer Guide* is designed to prepare you for the arrival of the Neptune Automatic Meter Reading (AMR) or Advance Metering Infrastructure (AMI) system software.

This chapter provides you with an introduction to the implementation process. It explains the focus of the guide, the pre-implementation personnel responsibilities, and general information on system support.

About This Guide

This guide provides basic information to help you get started with the implementation process. It is designed to be used by the utility manager and billing programmer to explain the steps that must be completed before on-site training can begin.

Typographical Conventions

Before you begin reading this guide, it is important to understand the typographical conventions used in the documentation. The following kinds of formatting in the text identify special information.

Table 1.1 – Typographical Conventions

Type	Description
All small caps	Refers to keys. Example: ENTER, ALT, TAB
All bold initial caps	Refers to field names, buttons, and functions within steps to follow. Example: **Device field**, **OK** button, or **File** menu
Lower case bold	Refers to the exact keystrokes you enter. What you type is always shown in lower case letters. Example: Type **neptune** in the **Device** field.

System Compatibility

Host Software Compatibility

Neptune is committed to backward compatibility with its innovative new product development.

N_SIGHT is compatible with the CE5320B, Trimble® Nomad®, Trimble® Ranger™3, and MRX920™.

N_SIGHT PLUS is compatible with the R900® Gateways, R450™ Data Collectors (R450 DC), and R450™ Mini Collectors (R450 MC).

Project Personnel Responsibilities

Responsibilities of the MIU Installation Manager

The following list describes the responsibilities of the meter interface unit (MIU) installation manager who works with the utility manager and the professional installers to ensure that the MIUs are active and communicating data.

- Know the meter requirements and specifications of the type of MIU being installed.
- Request and review the propagation studies for the specified area.
- Select professional installers for the project.
- Become very familiar with the following:
  - *R450™ MIU Quick Install Guide*, Part Number 1856-001
  - *R900® MIU Quick Install Guide*, Part Number 12519-001.

- Review instructions and procedures for installation with the installers as outlined in:
  - *R450™ MIU Wall and Pit Installation and Maintenance Guide*, Part Number 1857-001
  - *R900® MIU Wall and Pit Installation and Maintenance Guide*, Part Number 12560-001.
- Test each MIU.
  - R450 MIU — to be sure it transmits to the R450 DC or R450 MC
  - R900 MIU — to ensure it is transmitting valid data

N_SIGHT Host Software Project

Responsibilities of the Utility Manager

Listed below are the responsibilities of the utility manager who is the primary contact at the utility between the utility staff, the utility billing programmer, and the Neptune support staff.

- Direct the customer information system (CIS) utility billing system vendor to implement an interface to the N_SIGHT or N_SIGHT PLUS host software.
- Send an electronic copy of a sample import file containing utility customer route data to Neptune Customer Support for testing.
- Test the sample export file received from Neptune Customer Support to ensure compatibility with your CIS utility billing system.
- Purchase the appropriate computer hardware, software, and peripherals to comply with the system requirements.
- Coordinate training schedules with all required utility personnel and Neptune representatives.
- Unpack, setup, and charge all necessary equipment.

Responsibilities of CIS Utility Billing System Vendor

The utility's CIS utility billing system must be able to produce an interface process that does the following.

- Creates import files with meter reading route data in a Neptune file format.
- Processes data from the Neptune export file for the CIS utility billing system.

Responsibilities of Neptune

For N_SIGHT projects, a Neptune implementation specialist works with the utility manager and the utility billing programmer to ensure that all aspects of the project have been successfully completed and that all required utility personnel have been properly trained on the system.

N_SIGHT PLUS Host Software Project

This section provides information on the responsibilities of the N_SIGHT PLUS host software personnel for the project.

N_SIGHT PLUS Responsibilities of the Utility Manager

The following list describes the responsibilities of the utility manager who is the primary contact at the utility between the utility staff, the CIS utility billing system, and the Neptune support staff.

- Determine the site selection and accessibility for the Neptune R450 DC, R450 MC, or R900 Gateway.
- Work with Neptune in obtaining the necessary FCC license applicable to R450 only.
- Set up the cellular service (GSD/CDMA), if applicable.
- Provide and setup necessary Ethernet connection infrastructure.
- Assess the R450 DC, R450 MC, or R900 Gateway antenna tower access, including the power and cost of renting.

- Designate a manager for each of the following.
  - Data project
  - Collector/Gateway installation
  - MIU installation
- Manage the MIU installation in the most efficient way.
  - Internally
  - One route at a time
  - One zone at a time
  - Randomly
- Determine the implementation schedule to be used.
  - When to conduct the site survey
  - When to install the MIUs
  - When to install the software
  - When to train personnel

N_SIGHT PLUS Responsibilities of Neptune Systems Project Manager

The following list describes the responsibilities of the Neptune systems project manager who works with the utility manager to configure the N_SIGHT PLUS host software in preparation for deployment.

- Ensure the server and client PC for the N_SIGHT PLUS host software meet the requirements specified in section "N_SIGHT Host Software Requirements" on page 2-13 of this guide.
- Set up initial list of users and assign security levels.
- Set up the site ID.
- Set up R450 DCs, R450 MCs, or R900 Gateways.
- Configure and test the email service.

Responsibilities of R450 DC or R450 MC Installation Manager

The following list describes the responsibilities of the R450 DC or R450 MC installation manager who works with the utility manager and the professional installers to efficiently set up the fixed network R450 DCs or R450 MCs for use with the N_SIGHT PLUS host software.

- Know the requirements and specifications of the R450 DC as outlined in *R450™ Data Collector Installation and Maintenance Guide*, or *R450™ Mini Collector Installation and Maintenance Guide*.
- Work with the utility manager and Neptune's system project manager in selection of the site for the R450 DCs or R450 MCs.
- Confirm FCC licenses have been granted for each collector location.
- Select the professional installers for the project.
- Become very familiar with the following installation guidelines and procedures as outlined in the following guides.
  - *R450™ Data Collector Installation and Maintenance Guide*, Part Number 12835-001
  - *R450™ Mini Collector Installation and Maintenance Guide*, Part Number 13025-001
- Review instructions for installation with the professional installers.
- Oversee the installation of R450 DCs or R450 MCs.
- Coordinate activation and operation of the R450 DCs or R450 MCs with Neptune's system project manager.

Responsibilities of R900 Gateway Manager

The following list describes the responsibilities of the R900 Gateway installation manager who works with the utility manager and the professional installers to efficiently set up the R900 Gateways for use with the N_SIGHT PLUS host software.

- Know the requirements and specifications of the R900 Gateway as outlined in "Customer Requirements" on page 2-24.
- Work with the utility manager in selection of the site for the R900 Gateways.
- Select the professional installers for the project.
- Become very familiar with the installation guidelines and procedures outlined in the *R900® Gateway v4 Installation and Maintenance Guide*, Part Number 13194-001.
- Review instructions for installation with the professional installers.
- Oversee the installation of all R900 Gateways by coordinating the activation and operation with Neptune's system project manager.

Responsibilities of Neptune

The Neptune systems project manager works with the utility manager in obtaining the necessary FCC license (R450 only). Neptune secures a license based on a frequency determined for the best coverage area and then transfers it to the utility upon request.

With an R900 System, no licensing is required because it operates on an unlicensed frequency.

In addition, the Neptune systems project manager and the Neptune systems implementation specialist work with the following personnel at the utility to ensure the system has been installed, is operating as expected, and utility personnel have been trained.

- Utility manager
- Data project manager
- R450 DC and R900 Gateway installation manager
- MIU installation manager

General Information

Toll-Free Customer Support

For toll-free Neptune Customer Support, please dial (800) 647-4832 with your customer PIN number, Monday through Friday, 7:00 AM to 5:00 PM Central Standard Time. Your call is directed to the appropriate person.

Length of Software Warranty

The length of the standard software warranty is one year from the ship date unless a maintenance contract was included in the bid or original order. Please contact your local Neptune sales representative or distributor for pricing on extended maintenance agreements.

Equipment Repair

If your equipment requires repair, please contact our Customer Support representatives in order to obtain a Return Material Authorization (RMA) number. You can reach our support representatives by calling (800) 647-4832, emailing a request to hhsupp@neptunetg.com, or faxing a request to (334) 283-7497. Please be able to describe the nature of the problem, supply a serial number, and provide a contact name and telephone number for additional information.

Any item that is returned for any reason must be accompanied by an RMA number. Any return without an RMA is delayed in processing.

Ordering Additional Equipment

Please contact your local Neptune sales representative or distributor for prices on additional equipment. This information can also be obtained from the Customer Support department by calling the toll free number (800) 647-4832.

Additional Training

After your order is processed, a Neptune systems implementation specialist will contact you and schedule a tentative training date. Training schedules are subject to change if implementation phases are not completed.

Additional training is offered as refresher courses. Please contact your local Neptune sales representative or distributor for pricing information.

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Chapter 2: System Overview

This chapter presents overviews of the N_SIGHT and N_SIGHT PLUS host software applications and the following Neptune systems and their components.

- **AMR System** - provides automatic meter reading using walk-by or drive-by technology. See "AMR System Overview" on page 2-8.
- **AMI System** - provides advanced metering infrastructure, utilizing collectors and gateways to collect daily readings and other data. See "AMI System Overview" on page 2-16.

N_SIGHT and N_SIGHT PLUS Host Software Applications

This section provides a diagram of Neptune's N_SIGHT and N_SIGHT PLUS host software applications as well as the terminology used by both.

N_SIGHT and N_SIGHT PLUS System Architecture

The following illustration depicts the entire system architecture.

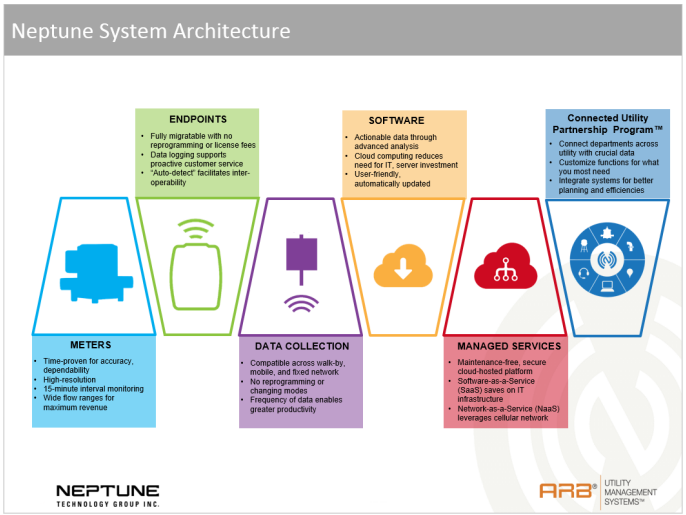

Figure 2.1 – Neptune AMR and AMI System

N_SIGHT General Terminology and Explanation

Before proceeding, note these standard industry terms. They are used in the subsequent section.

Table 2.1 – N_SIGHT General Terminology

Term	Description
AMR	Automatic Meter Reading. The automated process of reading meters.
ASCII	American Standard Code for Information Interchange.
ASCII file	Text file that uses the ASCII character set.
Unread accounts	Meters or accounts for which no reading was obtained or skip code assigned.
Cradle	Interface device allowing the handheld to communicate using Ethernet with the N_SIGHT host computer. The cradle has a built-in battery charger that recharges the handheld batteries when the handheld is in the cradle.
Devices	Term used in N_SIGHT meaning collection equipment such as handhelds, MRX920™ units, and R900® Belt Clip Transceivers (R900 BCT).
Downloading	Process of sending route information from the N_SIGHT database to the handheld or mobile data collector. Used interchangeably with loading.
EMR	Electronic Meter Reading. Similar to AMR.
ERT	Encoder Receiver Transmitter.
Handheld	Portable computer carrier by hand to collect meter readings, data logging, or other data.
MHz	Abbreviation for megahertz, where 1 MHz represents one million cycles per second.
MIU	Meter Interface Unit.

Table 2.1 – N_SIGHT General Terminology (continued)

Term	Description
Header ID	Five-character indicator field at the beginning of the header record that defines the type of detail information for a particular record. "RTEHD", "PRMDT", "MTRDT", and "RDGDT" are examples of Header ID values used with the N_SIGHT file format.
Host CIS utility billing system	System that permanently stores the customer account information used for utility bill generation. An interface between the CIS utility billing system and N_SIGHT is created to transfer data between both systems.
Meter	Measuring device.
R900 MIU/ R900 MIU v2 - v4	Neptune's radio frequency transmitter that broadcasts an MIU ID and the meter reading from a Neptune encoder or Invensys ECR II and III register.
Record ID	Five-character indicator field at the beginning of a record that defines the import type. The following are examples of Record ID values used with the N_SIGHT PLUS software: • COMHD • RTEHD • PRMDT • MTRDT • RDGDT • RTETR • COMTR
Uploading	Process of unloading the readings from the handheld or mobile data collector back to the host database. Used interchangeably with unloading.

N_SIGHT PLUS General Terminology and Explanation

Standard Industry Terms

Before proceeding, note these standard industry terms. They are used in the subsequent section.

Table 2.2 – N_SIGHT PLUS Standard Industry Terms

Term	Description
AMI	Advanced Metering Infrastructure. System that captures, stores, and provides at frequent intervals detailed consumption and other information, such as, usage, leak, and flow status, in order to support advanced applications. This data can then be used to support a consumer portal. Furthermore, the mass of data generated by the system can feed an advanced analytics system to convert it into actionable information that supports the efficient management of the utility.
Fixed network	System comprised of fixed network host software, wide area network (WAN), data collector (DC), and radio frequency meter interface unit (MIU) to enable the remote collection of metering data from absolute-encoder-equipped water meters or other compatible devices.
Header record	Record used in the import or export file indicating the start of a new data set such as a company header record, or a route header record. Used interchangeably with record ID.
Host software	Application that captures, manages, and stores meter data information for analysis and sends readings to the CIS utility billing system vendor.
Meter	Measuring device.
MIU	Meter Interface Unit. The radio transmitter that communicates from the meter to the receiver.
SIM	Subscriber Identity Module.

N_SIGHT PLUS Host Software Terms

The following is a list of terms that can be helpful for the N_SIGHT PLUS host software.

Table 2.3 – N_SIGHT PLUS Host Software Terms

Term	Description	Example
System ID	Unique system-wide number for a given utility to compartmentalize co-located collectors into virtual "groups".	101 (ABC Utility) 102 (Anytown) 104 (Metropolis)
Collector ID	Unique sequential description of collector for a given utility.	48329-0012 (Anytown 12)
Collector number	Sequential number of collector for a given customer number.	12
Customer number	Unique identifier for customer using zip for utility.	48329 (Anytown, AL)
Customer special number	Unique (Neptune-assigned) manufacturing special number used with part numbers. Special refers to the System ID and the frequencies for the customer.	SXXX
R450	Neptune's two-way FCC licensed system.	R450
R450 DC / R450 MC	Device that collects meter reading data from Neptune's absolute encoder register interfacing with Neptune's R450 MIU and transmits the data for collection. This unit receives, stores, and uploads the data to the N_SIGHT PLUS host software.	
R900	Neptune's unlicensed radio system.	R900

Table 2.3 – N_SIGHT PLUS Host Software Terms (continued)

Term	Description	Example
R900 Gateway	Device that collects meter reading data from Neptune's absolute encoder register interfacing with Neptune's R900 MIU and transmits the data for collection. This unit receives, stores, and uploads the data to the N_SIGHT PLUS host software.	S
Site ID	Indicator for the site location for the R900 Gateway.	

Meter Requirements

This system has been developed for use with any direct read meters (water and gas). It uses attachments to read a variety of Neptune meters and remote receptacles, all of which must contain unique ID numbers. The system can also read frequency-equipped electric meters with the appropriate handheld interface unit (HHIU).

Table 2.4 – Meter Requirements

Method	Description
ARB® versions 1 - 5	Contains a six-digit ID number and returns either a four-digit or six-digit reading. The ID is programmed through jumper wires inserted into the back of the receptacle. The procedure can be performed in the meter shop or at the installation side.
ProRead™ (ARB VI) register	Contains an ID number of up to 10 digits. It returns typically a four-digit, five-digit, or six-digit meter reading. When shipped from the factory, they are programmed with the ID number. However, this number can be changed at the meter shop using a Neptune Field Programmer.

Table 2.4 – Meter Requirements (continued)

Method	Description
E-CODER®	Is an electronic digital encoder register that has a proprietary integrated circuit that provides absolute registration with no internal battery requirement. The E-CODER functions in two modes: E-CoderBASIC and E-CoderPLUS. The E-CoderBASIC mode functionality is the same as Pro-Read (ARB VI) featuring up to a 10-digit programmable ID number, three user characters, and three-digit to six-digit meter reading. The E-CODER operates in E-CoderPLUS mode when connected to an R900 v2 or higher radio. It provides a high-resolution, eight-digit meter reading and value-added features including leak, tamper, and backflow detection.
R900 MIU/R900 MIU v2-v4	Is an RF transmitter for water meters. ID numbers are unique 10-digit numbers and are non-programmable.
R450 MIU	Is an RF transmitter for water meters. ID numbers are unique nine-digit numbers.

Meter Interface Unit (MIU) Requirements

The MIU is a radio endpoint designed to collect meter usage data and remotely transmit the information to an AMR or AMI system. The collected meter usage data is then compiled and presented in the N_SIGHT host software that can be used for billing to improve operational efficiency and handle customer service issues.

The MIU is capable of connecting with Neptune's E-CODER, a solid-state absolute encoder. The E-CODER provides eight-digit resolution, 15-minute interval data, and value-added features including leak, tamper, and reverse flow detection. The MIU is also compatible with ARB V, ProRead, and competitive encoders which use the Sensus UI 1203 protocol.

AMR System

This section provides you with an overview of the meter reading system and the system requirements.

AMR System Overview

Neptune's AMR system users can streamline handheld and mobile meter reading operations with the N_SIGHT host software. N_SIGHT provides an intuitive user interface, active directory secure log on, and data logging capabilities to assist with addressing customer issues.

The N_SIGHT host software suite supports Neptune's handheld devices and MRX920 mobile data collectors for reading R900 radio-equipped meters. The system can be handheld only, mobile only, or any combination thereof.

Meter Reading System

N_SIGHT can be installed on a standalone PC or configured for a client/server environment. On its own, it supports handhelds and mobile data collectors. It also can be used in conjunction with N_SIGHT PLUS which resides on a server to support a hybrid reading system.

At the start of each new billing cycle, meter reading route data is imported from the CIS utility billing system in the form of a Neptune import file using a standard ASCII file format. Readings are gathered by the collection devices whether they are handheld or drive-by, and then exported back to the CIS utility billing system.

Components

- **Handheld Computer** - device hand carried by the meter reader that electronically stores meter reading data in a walk-by system environment.
- **Mobile Data Collector** - RF receiver device paired with a laptop that is used in a vehicle to capture and store meter reading data in a mobile drive-by system environment.
- **N_SIGHT Host Software** - software that allows importing and exporting of route and reading data between the CIS utility billing system. It manages the operation of handheld and mobile meter reading processes.
- **Handheld Interface Unit (HHIU)** - RF receiver that processes AMR readings from meter interface units (MIUs) to handheld for storage.
- **R900 Belt Clip Transceiver (R900 BCT)** - RF receiver that processes AMR readings from MIUs to the handheld for storage.
- **Meter Interface Unit (MIU)** - electronic device that transmits meter reading information from water and gas meters to the receiver.
- **Handheld Accessories** - charging and communication cradles, communication cables, power supply, etc. used in conjunction with individual handhelds. See Figure 2.2 on page 2-10.

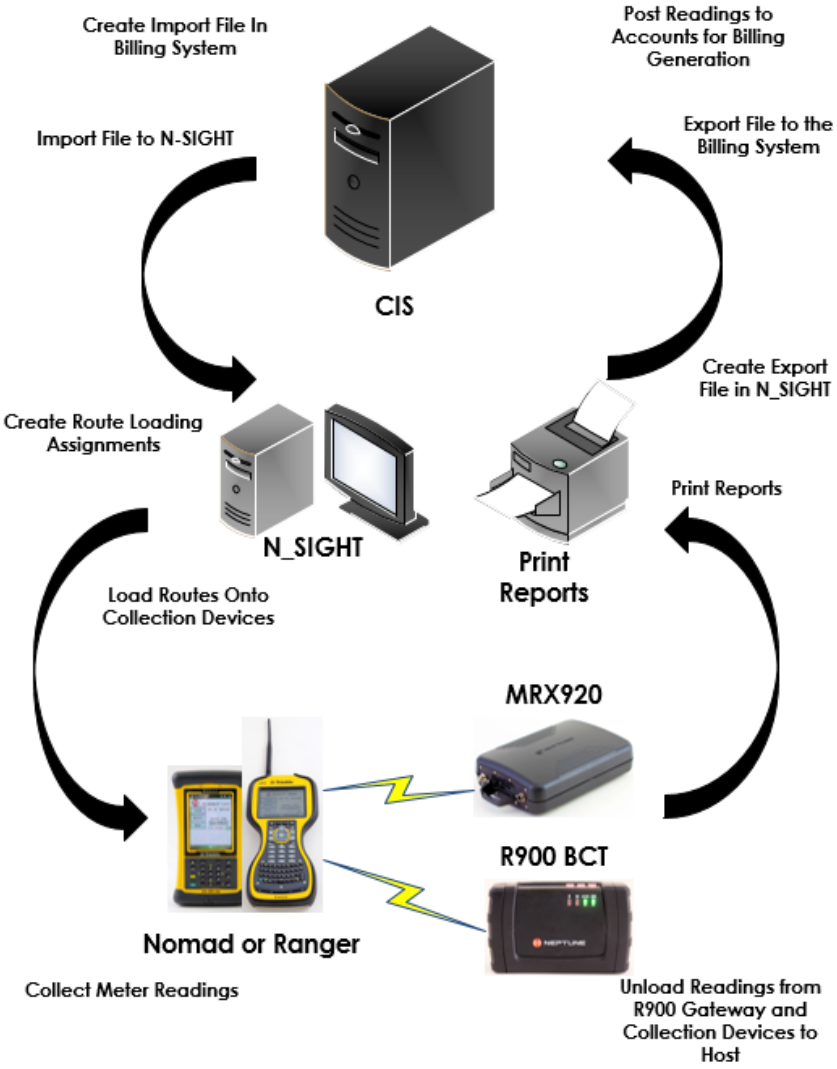

Figure 2.2 – N_SIGHT System Diagram

N_SIGHT System Setup

N_SIGHT provides several ways that you can set up your system depending on the size of your utility and the types of collection devices used. The following diagrams illustrate the different ways you can configure the AMR system.

N_SIGHT Single Office Setup

The following illustration demonstrates how N_SIGHT can be set up in a single office environment.

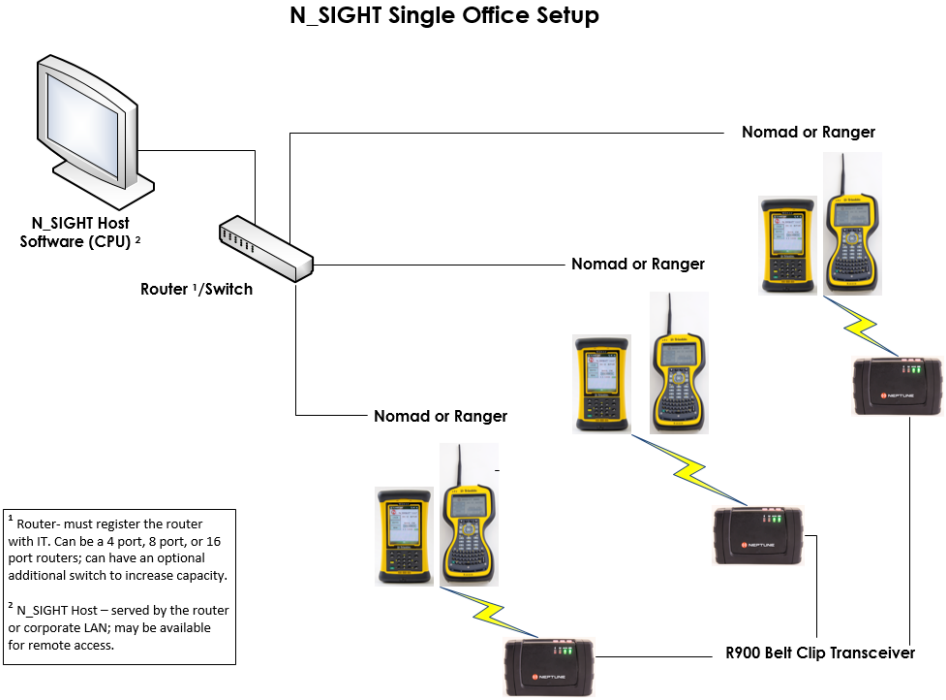

Figure 2.3 – N_SIGHT Single Office Setup

N_SIGHT Client/Server System Setup

The following illustration demonstrates how N_SIGHT can be set up for a client/server system.

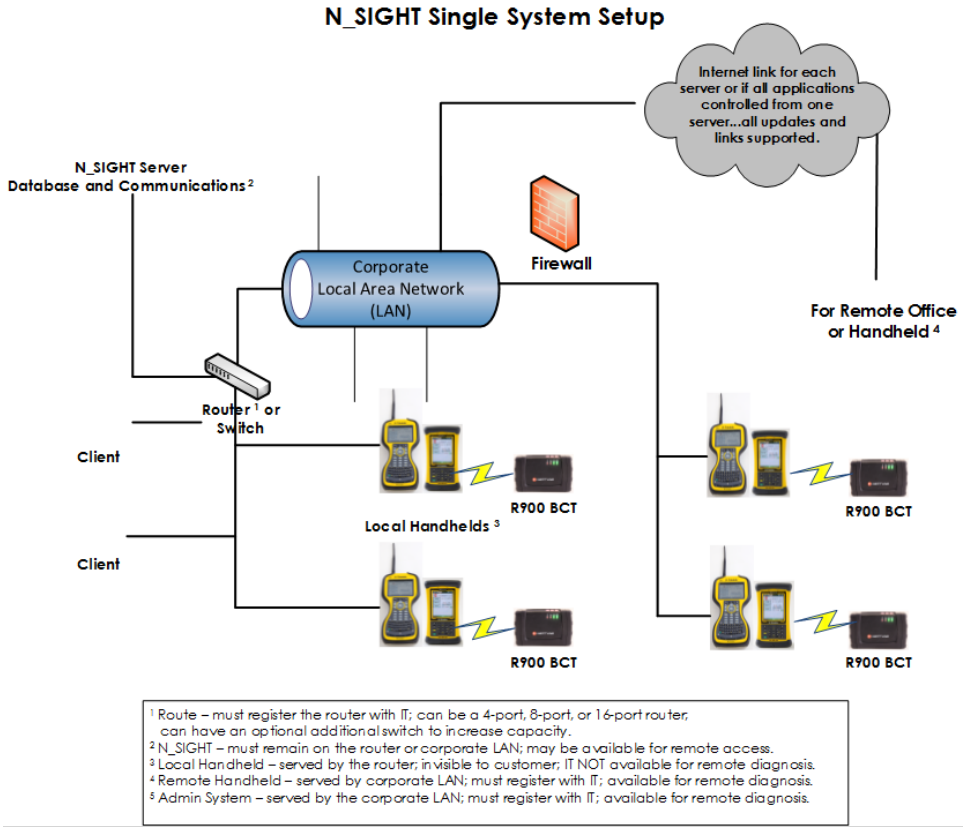

Figure 2.4 – N_SIGHT Client/Server System Setup

N_SIGHT Host Software Requirements

Types of N_SIGHT Installations

The best choice for your type of installation depends on factors such as whether N_SIGHT is running on a standalone computer or in a client/server environment. Table 2.5 provides a description of the types of installation and how to choose which one is best for you.

Table 2.5 – Types of N_SIGHT Installations

Type of Installation	Description
Host client/server	Install N_SIGHT on the server for hosting purposes in a client/server environment. This installation supports mobile, R900 Gateway v3, CMIU, and Cello devices. This installation type gives multiple-licensed clients the ability to work off the same database. Contact your distributor or Neptune Customer Support for assistance for setting additional client licenses.
Host desktop	Install N_SIGHT on a PC to be used in a standalone environment. This installation supports handhelds and mobile only. Please refer to "Installing N_SIGHT Host Software" on page 6-7.

N_SIGHT Host Software Requirements

To use the N_SIGHT host software, your computer and server need to meet the minimum requirements listed in the following sections. The following table explains the requirements needed to run N_SIGHT efficiently on a server. Table 2.6 on page 2-14 shows the minimum recommendation for an N_SIGHT server installation.

Table 2.6 – N_SIGHT Server Requirements

Component	Minimum Requirement
Operating system	Windows Server 2012® Standard and R2 Windows Server 2016® Standard
Processor	Intel® Core™ 2 Duo 2-gigahertz (GHz) processor or faster
Memory	Minimum 4 gigabytes (GB) of RAM
Network adapter	Network adapter appropriate for the type of local-area, wide-area, wireless, or home network to be connected to, and access to an appropriate network infrastructure; access to third-party networks can require additional charges
Monitor	Video adapter and monitor with Super VGA (1280 x 720) or higher resolution
Keyboard/mouse	Keyboard and a Microsoft mouse or other compatible pointing device
Hard disk drive	At least 1.5 GB of available space on the hard disk
RAID[1]	Neptune recommends using a RAID configuration for the N_SIGHT server installation

[1] Redundant Arrays of Inexpensive Disks (RAID)

N_SIGHT Client-Only/Standalone Requirements

The following table explains the requirements needed to run N_SIGHT efficiently in a client-only/standalone environment. The minimum requirements for an N_SIGHT client installation include the following.

Table 2.7 – N_SIGHT Client or Desktop Requirements

Component	Minimum Requirement
Operating system	Windows 8 Professional and Windows 8 Enterprise; Windows 10 Professional and Windows 10 Enterprise
Processor	Intel® Core™ 2 Duo 2-gigahertz (GHz) processor faster
Memory	Minimum 4 gigabytes (GB) of RAM
Monitor	Video adapter and monitor with Super VGA (1280 x 720) or higher resolution
Hard disk drive	At least 1.5 GB of available space on the hard disk
Keyboard/mouse	Keyboard and Microsoft mouse or other compatible pointing device
USB port	Minimum one USB port

Installation Considerations

The installation process is summarized in the following steps.

1. Upgrade your Windows operating system (if needed) before you install N_SIGHT. For more information, refer to "N_SIGHT Host Software Requirements" on page 2-13.
2. Install N_SIGHT as described in "N_SIGHT Host Desktop Installation" on page 6-7.

AMI System

This section provides you with an overview of the AMI system operations and a breakdown of the system components.

AMI System Overview

Neptune's AMI system users can get critical, timely data from the collectors or gateways as well as daily and hourly readings and consumption. The E-CODER register provides leak and reverse flow detection assist with customer service and conservation initiatives. This eliminates off-cycle readings for high water bill complaints, move-ins, or move-outs. Users also have an on-demand read capability (R900 Gateway v4 only).

Components

The AMI system components include the following:

- **N_SIGHT PLUS Host Software** - stores two years of historical hourly meter reading data. Supports priority alarms and event notifications for time critical issues such as leaks and reverse flows. Provides key performance indicators of system components for statistical analysis, trends, and troubleshooting. Includes a grouping tool and powerful reporting engine embedded with SAP BusinessObjects web intelligence to assist with conservation and district metering analysis.
- **N_SIGHT Host Software** - allows importing and exporting of route and reading data between the CIS utility billing system. It manages the operation of handheld and mobile meter reading processes.
- **R450 Data Collector or R450 Mini Collector** - collects and stores meter reading data from the R450 MIU. It synchronizes with the N_SIGHT PLUS host server on a scheduled interval. R450 DCs and R450 MCs are permanently mounted at typical sites such as water towers, buildings, or utility poles.
- **R450 Meter Interface Unit (MIU)** - transmits meter reading information from water meters to the R450 DC or R450 MC.

- **R900 Gateway** - collects and stores meter reading data from the R900 MIU. It synchronizes with the N_SIGHT PLUS host server on a scheduled interval. R900 Gateways are permanently mounted at typical sites such as water towers, buildings, or utility poles.
- **R900 Meter Interface Unit (MIU)** - transmits meter reading information from water meters to the R900 Gateway.

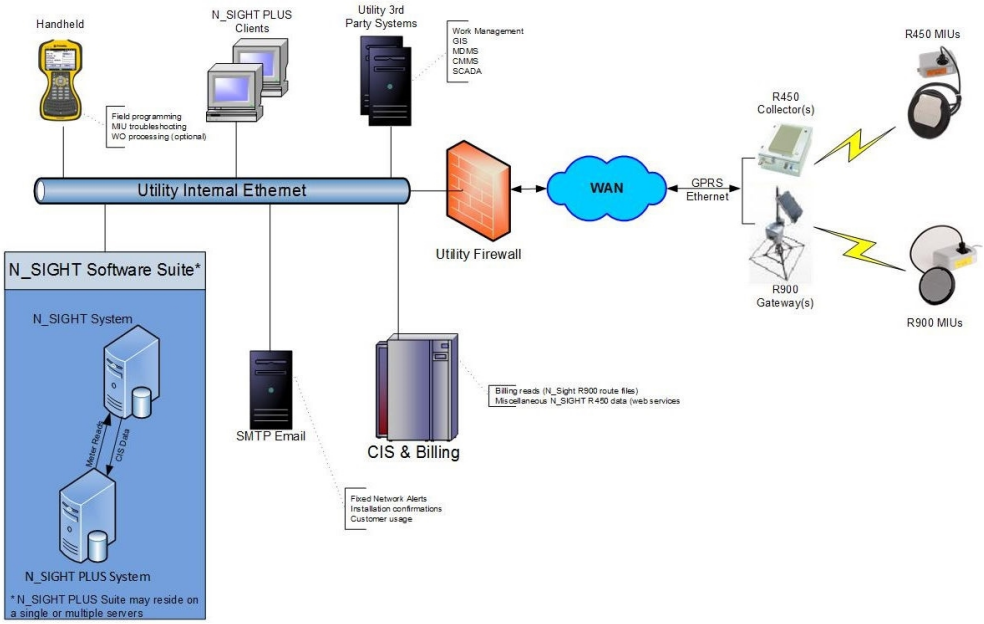

Figure 2.5 – N_SIGHT PLUS Flow Diagram

N_SIGHT PLUS Host Software

The N_SIGHT PLUS host software is designed to support key departments within your utility organization (customer service, billing, and operations) by providing high-value data in user-friendly screens and reports to help utility personnel manage their day-to-day operations. N_SIGHT PLUS provides users with easy system monitoring and control. The other option is to have Neptune provide hosting services where N_SIGHT PLUS users can access data in a cloud environment. Either way, utility personnel have full control of the advanced functionality of N_SIGHT PLUS 24 hours a day.

The N_SIGHT PLUS host software is a web-based, thin-client platform to support fixed network AMI.

- Review system-wide KPIs on a dashboard screen
- View graphical/tabular representation of consumption data
- Set and receive priority alarm notifications for leaks or backflow events
- Access detailed consumption profile information by account for proactive customer service instantly
- Eliminate truck rolls for move-ins and move-outs
- Provide over 30 standard reports and offers a custom reporting module

N_SIGHT PLUS Host Software Requirements

The N_SIGHT PLUS host software complies with prevailing industry standards and can run on a Windows-compatible PC.

System Requirements - Client PC Specifications

Table 2.8 on the facing page describes the minimum requirements for the client personal computer (PC).

Table 2.8 – N_SIGHT PLUS Client Requirements

Component	Minimum Requirement
Operating system	Windows 8 Professional and Windows 8 Enterprise; Windows 10 Professional and Windows 10 Enterprise.
Processor	Intel Core 2 Duo 2-gigahertz (GHz) processor or faster.
Memory	Minimum 4 GB RAM. To determine your processor speed and amount of RAM your computer has, do one of the following: • Choose **Start** | **Control Panel** | **Performance and Maintenance** | **System**. • Choose **Start** | **Settings** | **Control Panel** | **System**. The General tab of the System Properties dialog shows the memory in your system.
Monitor	Video adapter and monitor with Super VGA (1280 x 720) or higher resolution.
Hard disk drive	Minimum 1.5-GB of available space on the hard disk.
Network	Network adapter appropriate for the type of local-area, wide-area, wireless or home network you wish to connect to, and access to an appropriate network infrastructure; access to third-party network infrastructure; access to third-party networks can require additional charges.
Browser	Internet Explorer (version 9 or higher) and Firefox browsers supported.
Keyboard/ mouse	Keyboard and Microsoft mouse or other compatible pointing device.
USB port	Minimum one USB port.
Internet Explorer	Verion 9 or higher and Firefox browsers supported.

System Requirements - Server Specifications

This section provides information on the N_SIGHT PLUS server specifications.

When using N_SIGHT/N_SIGHT PLUS, there must be a dedicated server.

Table 2.9 – N_SIGHT PLUS Server Specifications

Number of Services	0 - 10,000	10,000 - 50,000	50,000 - 100,000
Operating system	Server 2012 Standard/R2, Server 2016 Standard (w/5 CALs)	Server 2012 Standard/R2, Server 2016 Standard (w/10 CALs)	Server 2012 Standard/R2, Server 2016 Standard (w/10 CALs)
Processor	Dual - Intel Xeon or higher (10M Cache, 4-Core, 80 W)	Dual - Intel Xeon or higher (10M Cache, 4-Core, 80 W)	Quad - Intel Xeon (24M Cache, 8-Core)
Logical processors	8	8	32
RAM	32-GB RDIMM, 1600 MT/s	64-GB RDIMM, 1600 MT/s	128-GB RDIMM, 1066 MT/s
Hard drive size (total)	3-TB	6-TB	8.4-TB (for every 100k endpoints)
OS (Partitioned) (Drive - C:)	100-GB	100-GB	100-GB
Database/back ups (separate partition other than Drive C:)	2.9-TB	5.9-TB	8.3-TB

Table 2.9 – N_SIGHT PLUS Server Specifications (continued)

Number of Services	0 - 10,000	10,000 - 50,000	50,000 - 100,000
Hard drive type	Raid 5 (RAID 10 preferred) 10k RPM or SSD	Raid 5 (RAID 10 preferred) 10k RPM or SSD	Raid 5 (RAID 10 preferred) 10k RPM or SSD
Network adapter	Yes - gigabit	Yes - gigabit	Yes - dual+gigabit
Power supply	Redundant	Redundant	Redundant

[1] Google Microsoft Client Access License

Pre-requisite Server Specifications

Please consider the following.

- Windows updates must be installed.
- .NET 3.5 Frameworks must be pre-installed.

Password Complexity

The server network password must be limited to nine characters to complete the installation.

Information Requirements

In addition to obtaining the meter reading from an MIU, R450 DC, or R900 Gateway, the system supports the following information requirements:

- Stores additional meter readings and status flag information from other monitoring devices (such as distribution line acoustic leak detection devices)
- Supports single-register and dual-register meters
- Supports meter readings of four digits to eight digits and MIU ID numbers up to 10 digits
- Supports Neptune output information
- Interfaces with Neptune's N_SIGHT host software application to support hybrid system operation
- Supports GIS type data to identify locations of account graphically
- Capable of storing all daily and hourly meter data information for two years
- Capable of using UPS and backup battery on R450 DCs, R450 MCs, or R900 Gateways in the event of a power outage or interruption in the communication link with the software
- Monitors the status of the WAN and alerts the user in the event of a problem impacting communications between the R450 DCs, R450 MCs, or R900 Gateways and N_SIGHT PLUS
- Capable of monitoring MIUs that have transmitted for the first time to identify successful installations and operation
- Provides (in conjunction with the supplier) the service of remotely monitoring the system and has controls in place to ensure optimized system operation
- Capable of monitoring status/performance of the R450 DCs, R450 MCs, and R900 Gateways in the network

N_SIGHT PLUS Account Setup

Account information is either imported directly from the CIS to N_SIGHT PLUS or by N_SIGHT through an ASCII file transfer.

For more information and the steps on how to set up your account, click ? while using the N_SIGHT PLUS host software to view the *N_SIGHT™ PLUS Online Help*.

N_SIGHT PLUS Mapping Module Requirements

The N_SIGHT PLUS mapping feature allows users to view the N_SIGHT PLUS host software in a variety of ways using standard mapping tools.

In order to use this feature, latitude and longitude (geographical coordinates) must be provided through the transfer file process from your CIS utility billing system vendor or through a file generated directly from the utility's GIS system. The coordinates must be provided in decimal degrees format.

Customers with Existing ESRI ArcGIS Servers

Mapping component features for customers with an existing ESRI ArcGIS server implementation are:

- The mapping component connects to the customer's in-house ESRI ArcGIS server environment.
- The mapping component has access to available ArcGIS server base maps.
- Specific GIS layers from the ArcGIS server can be exposed for viewing within N_SIGHT PLUS.

- Some asset information stored within the ArcGIS system is viewable within the N_SIGHT PLUS mapping component.
- The N_SIGHT PLUS mapping component provides view-only access to ArcGIS items.

Customers without an Existing In-House ESRI ArcGIS Server

Mapping component features for customers without an existing in-house ESRI ArcGIS server installation are:

- The mapping component supports the utilization of ESRI ArcGIS Online (Web-based) to provide all base maps.
- The mapping component utilizes ArcGIS online for all required geocoding of utility points (requires adequate asset location information; minimally, street address, city, state, and zip).

Reporting Module Requirements

The N_SIGHT PLUS reporting module provides users with the ability to utilize over 30 predefined reports or customized reporting to meet specific needs. They also have the ability to modify an existing predefined report with the deluxe option.

There are two levels of access for the reporting module. They are as follows:

- **Standard** - which allows users to sort, filter, show, and hide columns, and save as your own
- **Deluxe** - which provides all standard features as well as modify predefined reports, create new reports, schedule reports, and upload and export newly created reports

Report licensing is required to utilize the reporting module. Please contact your local Neptune sales representative for more information.

Customer Requirements

Server/System Setup and Specifications

The server hosting the database requires a static Internet Protocol (IP) address in order for the R450 DCs, R450 MCs, or R900 Gateways to be able to synchronize with the database. The IP address is coded into each R450 DC or R900 Gateway in the system.

The servers are usually located in a Demilitarized Zone (DMZ) portion of the network to isolate them from the rest of your network. The GPRS R450 DCs, R450 MCs, or R900 Gateways synchronize with the server from public IP addresses.

R450 DCs, R450 MCs, and R900 Gateways that use an Ethernet connection are part of utility's internal network and do not require the use of a DMZ. See Figure 2.6.

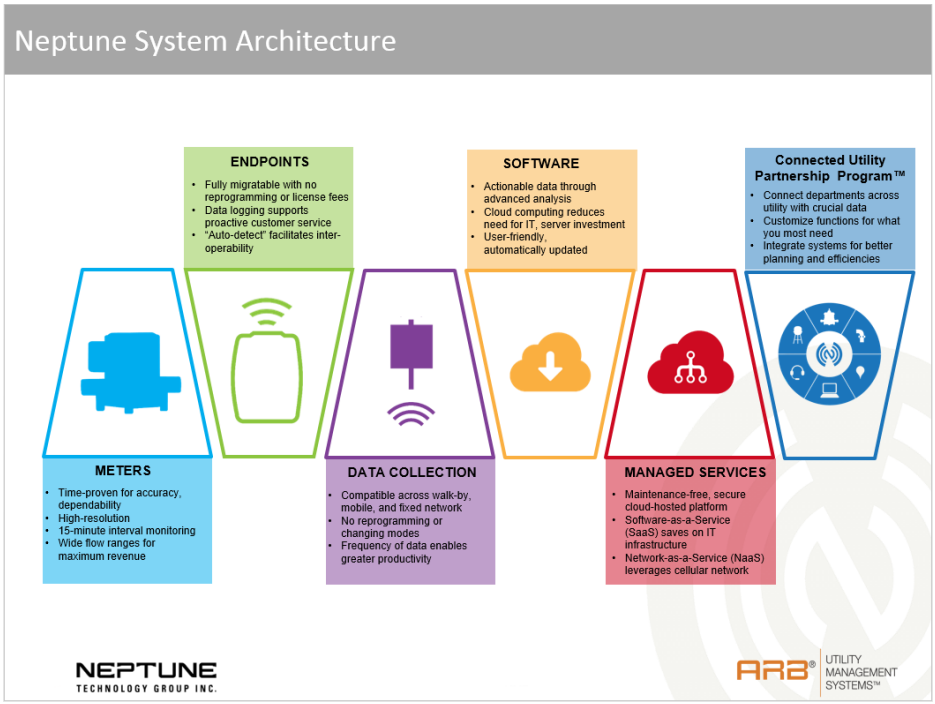

Figure 2.6 – Neptune AMR and AMI System

For the complete specifications for the server, refer to Table 2.9 on page 2-20

Small Mail Transfer Protocol (SMTP) for Emails

A key component of the N_SIGHT PLUS host software is the ability to send out emails for a wide range of applications.

- Configuration packets for the installers - either emails or Short Message Service (SMS) text messages (R450 only)
- Alarms and even notifications from MIUs for leaks and backflows
- Consumption graphs from customer service

N_SIGHT PLUS needs to connect to the utility's SMTP mail server in order to be able to send the emails and SMS messages.

Remote Access

To provide technical support and ongoing maintenance, Neptune customer support personnel require remote access to the server. This can be achieved in many different manners - the choice is up to the utility. This access can take the form of the following:

- Direct remote terminal access
- Virtual Private Network (VPN) direct connection
- Web-based remote access programs; for example, GoToMyPC
- Web-based remote access programs that require utility involvement; for example, GotoMeeting or GoToAssist

The Neptune project manager or customer support representative can discuss the various options with you.

Cellular Considerations

The following list discusses considerations when choosing cellular options.

- Two options are available: cellular modem, which comes standard, or Ethernet.
- All proposed R450 DC and R450 MC sites must have access to electrical power and either a cellular modem or a TCP/IP communication link to send messages to the N_SIGHT PLUS host software.
- Cellular modem customers must arrange for service prior to installation.

The cellular modem requires a SIM Card if using GSM service. Obtain the SIM card from the cellular service carrier. Customers wanting to use GSM can contact AT&T or T-Mobile. Customers wanting to use CDMA can contact Verizon or Sprint.

Ethernet Requirements

The R450 DC, R450 MC, or R900 Gateway Ethernet system uses AC power in conjunction with an Ethernet option.

There must be Ethernet access at the site.

Ethernet Considerations

R450 DCs and R450 MCs using Ethernet connections do not require special programming. When they are connected to the network, they acquire an address and start synchronization with the host database.

R450 System Wide Area Network (WAN) Options

The R450 DC and R450 MC can be ordered with a variety of WAN technologies to communicate with the N_SIGHT PLUS host software. The cellular modem option is standard; however, other available backhaul communication methods include Wi-Fi and Ethernet. See Table 2.10.

Table 2.10 – WAN Technology Alternatives

WAN Technology	Connectivity	Transport
Cellular	Continuous	IP
Ethernet	Continuous	IP

R450 DC and R450 MC - Network Coverage

The R450 DC or R450 MC is a fixed network data collector that provides two-way communication to the R450 MIU. The R450 System is tower-based and fully optimizes the high power R450 MIU and R450 DC or R450 MC to effectively cover a utility's system. Prior to system deployment, Neptune conducts a detailed propagation analysis using a modeling software customized to pinpoint the best locations for the R450 DCs and R450 MCs to ensure maximum message success rate as well as data security. One R450 DC or R450 MC supports several thousand R450 MIUs and multiple R450 DCs or R450 MCs can hear a single R450 MIU, providing the utility with the assurance that meter data comes through even if there is a temporary problem with individual R450 DCs or R450 MCs.

Power Outages

In the case of power outages at the R450 DC or R450 MC, each R450 DC and R450 MC is equipped with non-volatile memory to prevent loss of data. In case of loss of communications between the R450 DC or R450 MC and the host, the R450 DC or R450 MC is equipped with enough memory to allow it to continue to collect data for a minimum of three days before the data is over-written. The R450 DC or the R450 MC communicates that data to the host server and N_SIGHT PLUS host software after power or communication is restored between the R450 DC or the R450 MC and the host computer.

R900 Gateway - Network Coverage

The R900 Gateway v4 is a fixed network data collector that collects meter reading data from Neptune's R900 MIU. Data from the MIU is stored in the R900 Gateway until it synchronizes with N_SIGHT PLUS by means of Web services. The data is uploaded to N_SIGHT PLUS where it is used for analysis and transferred to the CIS utility billing system vendor for billing purposes. N_SIGHT PLUS allows you to monitor each R900 Gateway.

In the case of an AC power outage, the AC-powered version of the R900 Gateway uses its UPS that can provide up to eight hours of battery backup. In the solar version, the backup battery can power the unit for up to three days.

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Chapter 3: Implementation of N_SIGHT Software

This chapter explains in detail the steps needed to prepare for implementation of Neptune's N_SIGHT software suite and is designed to be used as a checklist to monitor the progress of your implementation until its completion.

Implementation Steps for N_SIGHT Software Suite

This section applies to both N_SIGHT and N_SIGHT PLUS host software. Steps 1 through 4 are to be completed by the utility, and Step 5 is completed by Neptune.

Step One: Complete File Conversion

The CIS utility billing system stores permanent history of customer account and meter information. To enable use of N_SIGHT, an interface between the CIS utility billing system must be created. Data is transferred by importing and exporting a file between both systems. The import file and export file must follow the N_SIGHT record structure as outlined in "Default Record Format" on page 4-1. Your utility billing and field service staff should become familiar with the detailed N_SIGHT record format in order to develop a conversion file from the utility billing database.

We strongly recommend use of the default record format to ensure compatibility with future software updates.

- Compare the field definitions of the v4 record format with the existing fields in your customer master database records.
- Identify conflicting and ambiguous definitions.
- Identify and define which fields in the record format are to be used in the conversion procedure.

- Determine which fields of your master database records fit into the corresponding fields that are to be used in the v4 file format.
- Verify that all the required fields contain valid characters and are correctly positioned in the import file.
- Verify that all required fields in the N_SIGHT export file are correctly positioned and accepted by the CIS utility billing system vendor.

CIS Utility Billing System Vendor and N_SIGHT PLUS

N_SIGHT PLUS can directly interface with the CIS utility billing system. N_SIGHT PLUS users utilizing the v2 - v4 file format, and using only R450 DCs and R450 MCs (no handhelds or mobile drive-by units), can import or export directly without using N_SIGHT.

When both N_SIGHT and N_SIGHT PLUS applications are used together, readings are automatically posted to the accounts during the import process in N_SIGHT. The completed route is then exported back to the CIS utility billing system. N_SIGHT PLUS is used for collecting and monitoring daily reads and customer profile data. N_SIGHT is used for managing the meter reading cycle.

Refer to Appendix A to see how readings are handled.

Step Two: Install a File Transfer Method

The file transfer communication method should permit the transfer of data between the CIS utility billing system and the PC that runs N_SIGHT. The N_SIGHT reading system uses standard American Standard Code for Information Interchange (ASCII) file representation.

After the conversion program produces the N_SIGHT import file, it must be transferred to the local workstation.

Files can have any extension. You can configure this setting for both import and export files.

After the meter readings are collected in the N_SIGHT host software, an export file is generated so that it can be sent back to the CIS utility billing system for posting and billing.

Step Three: Sample Route Files

The utility should generate a sample file to be tested by Neptune. Neptune customer support notifies you of any changes or modifications that are required to correct the file. Please follow the steps below to ensure proper delivery of your file(s).

1. Convert a section of your sample test database to an import file.
2. Email the sample file to hhsupp@neptunetg.com.

After your test file has been reviewed, an export file is generated for testing against your CIS utility billing system. This file contains several readings, notes, and audit failures, which replicates a typical reading cycle. After the export file is successfully accepted by your CIS utility billing system vendor, you are ready to schedule training.

Step Four: Schedule Training

Although on-site training dates can be scheduled in advance, Steps 1 through 3 need to be completed before training takes place. Any delays in these steps can postpone training dates.

When requesting training, please provide at least 60 days advance notice of the desired dates to allow for preparation. For available training dates and to schedule training, please contact your assigned systems implementation specialist at (800) 647-4832.

Step Five: On-Site System Training

The N_SIGHT training is composed of two segments: field personnel training and software user training. The duration of this training varies depending not only on the size and complexity of the installation but also on the number of employees to be trained.

The following is a list of the various topics to be discussed during training for both the field personnel and the PC operators. Please review these items and contact your systems implementation specialist at (800) 647-4832 if you have any questions.

Field Personnel Training

- Reading device(s) basic operation
- Meter and MIU overview
- Field troubleshooting

Host Software User Training

- Importing routes from CIS utility billing system
- Assigning/unassigning routes
- Loading/unloading handhelds/mobile devices
- Generating reports
- Exporting routes to CIS utility billing system
- Administrative functions and settings

Implementation Steps for Collectors and R900 Gateways

This section explains in detail the steps needed to prepare for fixed network AMI implementation whether using R450 DCs, R450 MCs, or R900 Gateways. It is also designed to be used as a checklist to monitor the progress of your implementation until its completion. Step one through four and six are to be completed by the utility, and step five is to be completed by Neptune.

Step One: Prior to Implementation

- Provide a list of the meter locations (address or GPS coordinates).
- Provide address and tower specifications for tower sites.
- Assist with discussions/negotiations with the owners to gain access for the R450 DC, R450 MC, or R900 Gateway installations, if buildings or other non-city-owned sites or towers are suggested as the best locations for them to be installed.
- Secure cellular service contracts for each R450 DC, R450 MC, or R900 Gateway (if Ethernet is available at a tower site, this is not necessary).
- Provide access through utility firewall for system monitoring and diagnostic work at Neptune.
- Assist with documentation to allow Neptune to transfer the FCC license (R450 only) secured by Neptune for the city to the city.

Step Two: Fixed Network Questionnaire

In addition to a Neptune Customer Profile, a Fixed Network Questionnaire must be completed to provide the required project information for system propagation and deployment.

Complete the following:

- Utility project contact
- IT contacts for server and networking support
- Data backhaul (cellular, Ethernet, or point-to-point wireless)
- CIS utility billing system information
- Meter/MIU installation contractor
- R450 DC, R450 MC, or R900 Gateway installation contractor

The R450 System requires FCC frequencies and license to be secured prior to order entry. Notify the Neptune sales representative to begin this process. FCC licensing is specific to R450 only.

If the propagation has not been completed prior to order, the utility manager should complete the Propagation Analysis Request Form, supplying requested details for the endpoint service locations and any property locations for Collector/Gateway installation.

After notification of a project through the Sales and Fixed Network Questionnaire, a system deployment project manager is assigned and reviews questionnaire and order details with customer to make sure parts are ordered correctly and project requirements are understood. Collector/Gateway site surveys are scheduled to better understand installation details, preferably with preferred wireless installation contractor.

In order for your AMI system to work in the most efficient way, the information contained on the questionnaire is critical to the deployment and implementation of the system. Allow ample time to complete this step.

Step Three: Install and Power the R450 DCs, R450 MCs, or R900 Gateways

Neptune works with the collector installation manager to ensure the proper installation of the R450 DCs, R450 MCs, or R900 Gateway. For proper installation procedures, please consult the appropriate guide.

- *R450™ Data Collector Installation and Maintenance Guide*, Part Number 12835-001

- *R450™ Mini Collector Installation and Maintenance Guide*, Part Number 13025-001
- *R900® Gateway Installation and Maintenance Guide*, Part Number 13194-001

After installation, the collector installation manager needs to turn on the power for the R450 DCs, R450 MCs, or R900 Gateways to verify transmission of data.

Neptune works with the MIU installation manager to ensure the proper installation of the MIUs. The R450 DC or R900 Gateway installation manager works with the MIU installation manager to be sure that the MIUs are transmitting and being received by the host server.

Step Four: Schedule Training

Although on-site training dates can be scheduled in advance, steps one through three need to be completed before training takes place. Any delay in these steps postpones training dates.

When requesting training, please provide at least a 60-day notice in advance of the desired dates to allow for preparation. For available training dates and to schedule training, please contact your assigned systems implementation specialist at (800) 647-4832.

Step Five: On-Site System Training

The N_SIGHT PLUS training is composed of two segments: software training and field service personnel training. The software training involves the system operator, usually the office manager or the second person in charge. The training for the customer service personnel includes those persons who are handling customer billing questions and issues. The duration of this training depends on the size and complexity of the installation and the number of employees to be trained.

N_SIGHT PLUS Training for System Operator

The following list describes the various topics to be discussed during training. Please review these items and contact your System Implementation Specialist at (800) 647-4832 if you have any questions.

- System Health Dashboard KPIs
- Customer service functions
- Reports
- Events and alarms
- User and table maintenance

Field Service Personnel Training

Field service personnel are also trained on the following functions.

- Meter/MIU installation and maintenance
- Troubleshooting
- R450 Collector/R900 Gateway maintenance and troubleshooting

Forms Required

The following forms are required prior to implementation. Sample forms are provided in Appendix C.

- Fixed Network Questionnaire
- Propagation Analysis Form

On-Site Visits

Refer to the following information for visits from the Neptune customer service representative.

- **First site visit**: This visit covers project kickoff, reviews of project details, and surveys of proposed collector locations with installation contractor.
- **Second site visit**: This visit covers R450 DC, R450 MC, or R900 Gateway configuration and inspection; host server setup and collector synchronization; MIU installation training and inspections; and preliminary overview of the host software.
- **Third site visit**: This visit covers the N_SIGHT PLUS host software and system overview training.

Site visits can be consolidated for small projects.

Followup Monitoring

Neptune customer support begins initial monitoring after the MIU installations. System monitoring can be extended by purchasing through sales or distribution. For more information on product support, refer to "Toll-Free Customer Support" on page 1-8.

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Chapter 4: N_SIGHT v4 File Format

This chapter discusses the N_SIGHT v4 file layout, required, and optional fields for developing the interface to the CIS utility billing system.

Default Record Format

The N_SIGHT v4 file format consists of one layout that is used for both importing and exporting data. The data is broken down into record types with the most meaningful data contained at the beginning of the record. This allows you to browse the file to see pertinent data without scrolling to the right.

The following pages are a summary of all required and optional fields.

In the export file that is returned from N_SIGHT to the CIS utility billing system, you receive the default character that is specified in the N_SIGHT software setup (typically the same character you sent).

Table 4.1 – Legend for v4 Record Format

Parameter	Description
Column	Name of the column in the record.
Use	Indicator for the use of this record: required (Req) or optional (Opt). Fields marked optional must contain blanks in the file if not populated with data.
Source	Indicates the system that populates data in the field: handheld (HH), CIS utility billing system vendor (UB), or N_SIGHT host software (HS).
Offset	Position of the field in the record.
Length	Character length of the field.
Type	Field type: can be numeric (NUM), alphanumeric (A/N), or Boolean (BOO). Boolean fields are case sensitive and must be either "Y" or "N".
Comment	Additional notes concerning the field, valid format, etc. Quotation marks indicate the only acceptable data for the field.

Record Type Hierarchy

The following tables represent the format for the record type hierarchy used in N_SIGHT v4 record layout.

Table 4.2 – Record Type Hierarchy - Required

Record Type	Name	Parent Record Type	Comment
Company Header	COMHD	File	Requires one per Company Header Record. Generally, most customers have one Company Header Record per file. Customers who have one database for multiple locations can have multiple Company Header Records per file.
Route Header	RTEHD	Company Header	Indicates start of route. One or more per Company Header record.
Premise Detail	PRMDT	Route Header	Requires one per address.
Alternate Premise Detail	PRMD2	Route Header	Requires one per address. This record can be used instead of the Premise Detail if using all of the v4 field format fields (City, State, Zip, Email, etc).
Meter Detail	MTRDT	Premise Detail	Requires one per unique meter.
Reading Detail	RDGDT	Meter Detail	Requires one per register reading.
Route Trailer	RTETR	Route Header	Indicates end of route. One per Route Header.
Company Trailer	COMTR	Company Header	Indicates end of routes for company. One or more per file.

Table 4.3 – Record Type Hierarchy - Optional

Record Type	Name	Parent Record Type	Comment
Premise Notes	PRMNT	Premise Detail	One required per Premise Detail Record.
ERT Detail	ERTDT	Reading Detail	Required for ERTs. One required per Reading Detail Record.

Table 4.4 – Record Type Hierarchy - Export File Only

Record Type	Name	Parent Record Type	Comment
Order Status	ORDST	Meter Detail	One per Meter Detail Record.
Vehicle Detail	VHLDT	Company Header	Multiple records exported if vehicle information is captured. The VHLDT records are not associated to a particular route.

Sample Layout

The following illustrates the sample layout for a typical import file:

Table 4.5 – One Company Header with One Route

COMHD				
	RTEHD			
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
	RTETR			
COMTR				

Table 4.6 – One Company Header / Multiple Meters at Each Premise

COMHD				
	RTEHD			
		PRMDT		
			MTRDT	
				RDGDT
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
			MTRDT	
				RDGDT
	RTETR			
COMTR				

Table 4.7 – One Company Header with Compound Meters

COMHD				
	RTEHD			
		PRMDT		
			MTRDT	
				RDGDT
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
				RDGDT
			MTRDT	
				RDGDT
				RDGDT
	RTETR			
COMTR				

Table 4.8 – One Company Header with Multiple Routes

COMHD				
	RTEHD			
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
	RTETR			
	RTEHD			
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		

Table 4.8 – One Company Header with Multiple Routes (continued)

			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
	RTETR			
COMTR				

Table 4.9 – Multiple Company Headers with One Route Each

COMHD				
	RTEHD			
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
	RTETR			
COMTR				
COMHD				
	RTEHD			
		PRMDT		
			MTRDT	

Table 4.9 – Multiple Company Headers with One Route Each (continued)

				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
	RTETR			
COMTR				

Table 4.10 – Using Alternative Premise Detail Record

COMHD				
	RTEHD			
		PRMD2		
			MTRDT	
				RDGDT
		PRMD2		
			MTRDT	
				RDGDT
		PRMD2		
			MTRDT	
				RDGDT
		PRMD2		
			MTRDT	
				RDGDT
		PRMD2		
			MTRDT	
				RDGDT
	RTETR			
COMTR				

Table 4.11 – Using Premise Notes

COMHD				
	RTEHD			
		PRMDT		
			PRMNT	
				MTRDT
				RDGDT
		PRMDT		
			PRMNT	
				MTRDT
				RDGDT
		PRMDT		
			PRMNT	
				MTRDT
				RDGDT
		PRMDT		
			PRMNT	
				MTRDT
				RDGDT
		PRMDT		
			PRMNT	
				MTRDT
				RDGDT
	RTETR			
COMTR				

Table 4.12 – Using ERT Detail[1]

COMHD				
	RTEHD			
		PRMDT		
			MTRDT	
				RDGDT
				ERTDT[1]
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
				ERTDT
		PRMDT		
			MTRDT	
				RDGDT
		PRMDT		
			MTRDT	
				RDGDT
	RTETR			
COMTR				

[1] Only accounts that have ERT devices require the ERTDT record.

Table 4.13 – Export: One Company Header with One Route

COMHD				
	RTEHD			
		PRMDT		
			MTRDT	
				ORDST
				RDGDT
		PRMDT		
			MTRDT	
				ORDST
				RDGDT
VHLDT				
	RTETR			
COMTR				

Table 4.14 – Export: One COMHD w / Compound Meters

COMHD				
	RTEHD			
		PRMDT		
			MTRDT	
				ORDST
				RDGDT
			MTRDT	
				ORDST
				RDGDT
		PRMDT		
			MTRDT	
				ORDST
				RDGDT
			MTRDT	
				ORDST
				RDGDT
		PRMDT		
			MTRDT	
				ORDST
				RDGDT
			MTRDT	
				ORDST
				RDGDT

Table 4.14 – Export: One COMHD w / Compound Meters (continued)

VHLDT				
	RTETR			
COMTR				

Record Formats

Header Formats

The following tables represent the format for the record layouts used by N_SIGHT.

Table 4.15 – Company Record Format

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'COMHD'
Company Code	Req	UB	6-9	4	A/N	
Create Date	Req	UB	10-17	8	NUM	YYYMMDD
Description	Opt	UB	18-57	40	A/N	
File Version	Req	UB	58	1	NUM	'4'
Service Orders	Req	UB	59	1	BOO	Y or N
CRLF	Req	UB	60-61	2		

Table 4.16 – Route Record Format

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'RTEHD'
Office	Req	UB	6-9	4	A/N	
Cycle	Req	UB	10-13	4	A/N	
Route	Req	UB	14-23	10	A/N	
Read Date	Req	UB	24-31	8	NUM	YYYYMMDD; 00000000 if not used
Deactivate Date	Req	UB	32-39	8	NUM	YYYYMMDD; 00000000 if not used
Route Message	Opt	UB	40-119	80	A/N	
CRLF	Req	UB	120-121	2		

The Route ID in N_SIGHT is a combination of the Company Code, Office, Cycle, and Route fields.

Table 4.17 – Premise Details Record Format

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'PRMDT'
Address 1	Req	UB	6-31	26	A/N	
Address 2	Opt	UB	32-57	26	A/N	
Customer Name	Req	UB	58-83	26	A/N	
Premise Key	Req	UB	84-103	20	A/N	Uniquely identifies the premise. Always remains the same for the premise.
Account Number	Req	UB	104-123	20	A/N	
Account Status	Req	UB	124-127	4	A/N	Account status codes.
Premise Custom 1	Opt	UB	128-153	26	A/N	Custom display fields for premise screen.
Premise Custom 2	Opt	UB	154-179	26	A/N	
Utility Pass Through	Opt	UB	180-307	128	A/N	Any utility-defined information.
CRLF	Req	UB	308-309	2		

Table 4.18 – Alternate Premise Details Record Format[1]

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'PRMD2'
Premise Key	Req	UB	6-25	20	A/N	
Customer Name 1	Req	UB	26-51	26	A/N	
Customer Name 2	Opt	UB	52-77	26	A/N	
Customer Contact	Opt	UB	78-103	26	A/N	
Account Number	Req	UB	104-123	20	A/N	
Account Status	Req	UB	124-127	4	A/N	Account status codes
Customer Address House Number	Req	UB	128-134	7	A/N	
Customer Address HSuffix	Req	UB	135-141	7	A/N	
Customer Address Unit	Req	UB	142-156	15	A/N	
Customer Address Predir	Req	UB	157-158	2	A/N	
Customer Address Street	Req	UB	159-183	25	A/N	
Customer Address Suffix	Req	UB	184-187	4	A/N	
Customer Address Postdir	Req	UB	188-189	2	A/N	
Customer Address City	Req	UB	190-215	26	A/N	

Table 4.18 – Alternate Premise Details Record Format1 (continued)

Column	Use	Source	Offset	Length	Type	Comment
Customer Address State	Req	UB	216-217	2	A/N	
Customer Address Zip	Req	UB	218-228	11	A/N	• Required for geocoding for mapping subscriptions • Maximum number of digits is 9 • Do not include dashes • ex: zzzzzzzzz
Customer Phone 1	Opt	UB	229-238	10	A/N	
Customer Phone 2	Opt	UB	239-248	10	A/N	
Mail Name 1	Opt	UB	249-274	26	A/N	
Mail Name 2	Opt	UB	275-300	26	A/N	
Mail Address 1	Opt	UB	301-326	26	A/N	
Mail Address House Number	Opt	UB	327-333	7	A/N	
Mail Address HSuffix	Opt	UB	334-340	7	A/N	
Mail Address Unit	Opt	UB	341-355	15	A/N	
Mail Address Predir	Opt	UB	356-357	2	A/N	
Mail Address Street	Opt	UB	358-382	25	A/N	

Table 4.18 – Alternate Premise Details Record Format1 (continued)

Column	Use	Source	Offset	Length	Type	Comment
Mail Address Suffix	Opt	UB	383-386	4	A/N	
Mail Address Postdir	Opt	UB	387-388	2	A/N	
Mail City	Opt	UB	389-414	26	A/N	
Mail State	Opt	UB	415-416	2	A/N	
Mail Zip	Opt	UB	417-427	11	A/N	Maximum number of digits is 9; Do not include dashes
Mail Phone	Opt	UB	428-437	10	A/N	
Permit	Opt	UB	438	1	BOO	Y/N
Premise Custom 1	Opt	UB	439-464	26	A/N	
Premise Custom 2	Opt	UB	465-490	26	A/N	
Utility Pass Through	Opt	UB	491-618	128	A/N	
Email Address	Opt	UB	619-668	50	A/N	
CRLF	Req	UB	669-670	2	A/N	

[1] Reserved for future use.

Table 4.19 – Premise Notes Record Format - Optional

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'PRMNT'
Hazard Code	Opt	UB	6-9	4	A/N	
Changed Hazard Code	Opt	HH	10-13	4	A/N	Changed value coming back from field
Hazard Text	Opt	UB	14-39	26	A/N	Freeform hazard text
Changed Hazard Text	Opt	HH	40-65	26	A/N	
Special Instruction	Opt	UB	66-365	300	A/N	
Special Instruction 2	Opt	UB	366-665	300	A/N	
Changed Special Instruction	Opt	HH	666-965	300	A/N	
Changed Special Instruction 2	Opt	HH	966-1265	300	A/N	
Force Special Instruction	Req	UB	1,266	1	BOO	'Y' or 'N'
Force Special Instruction 2	Req	UB	1,267	1	BOO	'Y' or 'N'
Changed Force Special Instruction	Req	HH	1,268	1	BOO	'Y' or 'N'
Changed Force Special Instruction 2	Req	HH	1,269	1	BOO	'Y' or 'N'
CRLF	Req	UB	1,270-1,271	2		

Table 4.20 – Meter Detail Record Formats

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'MTRDT'.
Read Sequence	Req	UB	6-11	6	NUM	Right-justify, zero-fill.
Changed Read Sequence	Opt	HH	12-17	6	NUM	Changed value coming back from field.
Meter Key	Req	UB	18-37	20	NUM	Key to identify the meter within the premise_key. Use meter number for this unless the CIS utility billing system vendor has a better key.
Meter Number	Req	UB	38-57	20	NUM	
Changed Meter Number	Opt	HH	58-77	20	NUM	Actual meter number found in field.
Meter Type	Req	UB	78-81	4	A/N	
Changed Meter Type	Opt	HH	82-85	4	A/N	
Meter Size	Opt	UB	86-93	8	A/N	
Changed Meter Size	Opt	HH	94-101	8	A/N	

Table 4.20 – Meter Detail Record Formats (continued)

Column	Use	Source	Offset	Length	Type	Comment
Meter Manufacturer	Opt	UB	102-104	3	A/N	Three-character code for the meter manufacturer.
Changed Meter Manufacturer	Opt	HH	105-107	3	A/N	Do not use zeros, leave blank if no date is provided.
Meter UOM	Opt	UB	108-110	3	A/N	Unit of Measure - for display purpose only. Example: CF = cubic feet.
Changed Meter UOM	Opt	HH	111-113	3	A/N	
Meter Location	Opt	UB	114-117	4	A/N	
Changed Meter Location	Opt	HH	118-121	4	A/N	
Meter Location 2	Opt	UB	122-125	4	A/N	
Changed Meter Location 2	Opt	HH	126-129	4	A/N	
Read Instruction 1	Opt	UB	130-133	4	A/N	
Changed Read Instruction 1	Opt	HH	134-137	4	A/N	
Read Instruction 2	Opt	UB	138-141	4	A/N	
Change Read Instruction 2	Opt	HH	142-145	4	A/N	

Table 4.20 – Meter Detail Record Formats (continued)

Column	Use	Source	Offset	Length	Type	Comment
Seal Number	Opt	UB	146-155	10	A/N	
Changed Seal Number	Opt	HH	156-165	10	A/N	
Meter Install Date	Opt	UB	166-173	8	N	YYYYMMDD. Optional; from CIC utility billing system vendor. Do not use zeros, leave blank if no date is provided.
Meter Custom 1	Opt	UB	174-199	26	A/N	
Meter Custom 2	Opt	UB	200-225	26	A/N	
Meter Condition Code 1	Opt	HH	226-229	4	A/N	
Meter Condition Code 2	Opt	HH	230-233	4	A/N	
Must Read Code	Opt	UB	234	1	BOO	'Y' or 'N'(must read if 'Y').
Collector Error	Opt	HH	235-244	10	A/N	Values it contains change based upon the collector type used.
Prev Read Date	Opt	UB	245-252	8	A/N	YYYYMMDD.
Constant / Multiplier	Opt	UB	253-258	6	A/N	

Table 4.20 – Meter Detail Record Formats (continued)

Column	Use	Source	Offset	Length	Type	Comment
Changed Constant / Multiplier	Opt	HH	259-264	6	A/N	
Xcoord	Opt	UB	265-276	12	A/N	Longitude.
Ycoord	Opt	UB	277-288	12	A/N	Latitude.
Xcoord2	Opt	UB	289-300	12	A/N	For future use.
Ycoord2	Opt	UB	301-312	12	A/N	For future use.
Xcoord3	Opt	UB	313-324	12	A/N	For future use.
Ycoord3	Opt	UB	325-336	12	A/N	For future use.
CRLF	Req	UB	337-338	2		

Table 4.21 – Order Status Record Formats - Export File Only

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	HS	1-5	5	A/N	'ORDST'.
Completion Date	Req	HH	6-13	8	NUM	YYYYMMDD
Time Stamp	Req	HH	14-19	6	NUM	HHMMSS
Elapsed Time	Req	HH	20-24	5	NUM	Elapsed time in seconds
Reader ID	Req	HH	25-44	20	A/N	
Order Status	Req	HH	45-46	2	A/N	IN - incomplete CO - complete SK - skipped
Skip Code	Req	HH	47-50	4	A/N	Only if order status = 'SK'
Comment Code 1	Req	HH	51-54	4	A/N	
Comment Code 2	Req	HH	55-58	4	A/N	
Note Back	Req	HH	59-186	128	A/N	
CRLF	Req	HS	187-188	2		

Table 4.22 – Read Detail Record Formats

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'RDGDT'.
Read Type	Req	UB	6-9	4	A/N	Details of a particular register, for example: • HIGH • LOW • GAL • CFT • WTR • GAS
Collection ID	Req	UB	10-22	13	NUM	Indicates the MIU serial number; Use 'spaces' if device provides no ID value
For Future Use		UB	23-29	7	A/N	
Changed Collection ID	Opt	HH	30-49	20	NUM	
Dials	Req	UB	50-51	2	NUM	Maximum value for dials should not be greater than 10
Changed Dials	Opt	HH	52-53	2	NUM	Maximum value for dials should not be greater than 10
Decimals	Req	UB	54-55	2	NUM	Maximum value for decimals should not be greater than 10

Table 4.22 – Read Detail Record Formats (continued)

Column	Use	Source	Offset	Length	Type	Comment
Changed Decimals	Opt	HH	56-57	2	NUM	Maximum value for decimals should not be greater than 10
Read Direction	Opt	UB	58	1	A/N	R, L, C, or blank only.
Hi Limit	Req	UB	59-68	10	NUM	
Low Limit	Req	UB	69-78	10	NUM	
Prev Read	Req	UB	79-88	10	NUM	
Reading	Req	HH	89-98	10	A/N	
Collector Reading	Req	HH	99-108	10	A/N	Raw unadjusted reading from the MIU.
Read Code	Req	HH	109-110	2	A/N	
Re-entry Count	Req	HH	111-112	2	NUM	
Water No Flow 35 Days	Req	HH	113	1	NUM	Number of days.
Peak Backflow	Req	HH	114	1	NUM	Reverse Flow.
Leak 35 Days	Req	HH	115	1	NUM	Number of days.
Current Leak	Req	HH	116	1	NUM	Leak Status.
Previous Error Count	Opt	UB	117	1	NUM	Gas tamper. Use '8' to suppress tamper check.

Table 4.22 – Read Detail Record Formats (continued)

Column	Use	Source	Offset	Length	Type	Comment
Current Error Count	Req	HH	118	1	NUM	Current error/tamper count for R900G.
Fatal Error	Req	HH	119	1	NUM	Fatal error flag for R900G.
Non-Fatal Error/Flag	Req	HH	120	1	NUM	Non-fatal error flag for R900G.
Voltage	Req	HH	121-123	3	NUM	Operating meter voltage for R900.
MIU Type	Req	HH	124-125	2	NUM	Utility meter type.
AMR Read Type	Req	HH	126-127	2	NUM	AMR reading type.
High Power	Req	HH	128	1	NUM	High versus low power indicator for all R900s.
R900 Format	Req	HH	129-130	2	NUM	The R900 reading format: 0 - Binary 2 - "Data Stream" (not used) 3 - E-CODER 4 - Mlog
Display Digits	Req	HH	131	1	NUM	Number of digits in main reading display.
Multiplier Applied	Req	HH	132	1	NUM	
Gas No Flow	Req	HH	133	1	NUM	Period for which there has been no gas flow.

Table 4.22 – Read Detail Record Formats (continued)

Column	Use	Source	Offset	Length	Type	Comment
Current Gas Backflow Tamper	Req	HH	134	1	NUM	
Current Gas Removal Tamper	Req	HH	135	1	NUM	
Current Gas Magnetic Tamper	Req	HH	136	1	NUM	
ERT Inversion Tamper	Req	HH	137	1	NUM	
ERT Reverse Tamper	Req	HH	138	1	NUM	
35-Day Gas Backflow Tamper	Req	HH	139	1	NUM	
35-Day Gas Removal Tamper	Req	HH	140	1	NUM	
35-Day Gas Magnetic Tamper	Req	HH	141	1	NUM	
35-Day Program Flag	Req	HH	142	1	NUM	R900G only.
Reed Switch Failure Flag	Req	HH	143	1	NUM	R900G only.

Table 4.22 – Read Detail Record Formats (continued)

Column	Use	Source	Offset	Length	Type	Comment
Addtional Flags	Req	HH	144-212	69		For future use.
Register Manufacturer	Req	HH	213-237	25	A/N	
Register Install Date	Req	HH	238-245	8	NUM	YYYYMMDD.
Register ID	Req	HH	246-255	10	A/N	
CRLF	Req	UB	256-257	2		

Table 4.23 – ERT Detail Record Formats - Optional

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'ERTDT'.
Tone	Req	UB	6-7	2	NUM	
Freq Channel	Req	UB	8-11	4	NUM	
Prev Tamper 1	Req	UB	12	1	A/N	Use '8' to suppress tamper check.
New Tamper 1	Req	HH	13	1	A/N	
Prev Tamper 2	Req	UB	14	1	A/N	Use '8' to suppress tamper check.
New Tamper 2	Req	HH	15	1	A/N	

Table 4.23 – ERT Detail Record Formats - Optional (continued)

Column	Use	Source	Offset	Length	Type	Comment
ERT Type	Req	HH	16-17	2	A/N	
CRLF	Req	UB	18-19	2	A/N	

Table 4.24 – Route Trailer Record Format

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	UB	1-5	5	A/N	'RTETR'.
Office	Req	UB	6-9	4	A/N	
Cycle	Req	UB	10-13	4	A/N	
Route	Req	UB	14-23	10	A/N	
# Premises	Req	UB	24-29	6	A/N	One input field can be blank if total is unavailable.
# Meters	Req	UB	30-35	6	A/N	One input field can be blank if total is unavailable.
CRLF	Req	UB	36-37	2		

Table 4.25 – Vehicle Detail Record Format - Export File Only

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Req	HS	1-5	5	A/N	'VHLDT'
Reader ID	Req	HH	6-25	20	A/N	
Vehicle ID	Req	HH	26-45	20	A/N	
Date	Req	HH	46-55	10	NUM	YYYYMMDD
Start Time	Req	HH	56-59	4	NUM	HHMM
End Time	Req	HH	60-63	4	NUM	HHMM
Start Miles	Req	HH	64-73	10	A/N	
End Miles	Req	HH	74-83	10	NUM	
CRLF	Req	HS	84-85	2		

Table 4.26 – Company Trailer Record Format - Optional

Column	Use	Source	Offset	Length	Type	Comment
Record ID	Opt	UB	1-5	5	A/N	'COMTR'
Company Code	Req	UB	6-9	4	A/N	
# Routes	Req	UB	10-15	6	A/N	One input field can be blank if total is unavailable
CRLF	Req	UB	16-17	2		

Field Definitions

The following fields are defined in alphabetical order for your reference. Keep in mind the following:

- *Alphanumeric* means you can have a combination of numerical and/or alphabetical characters, which can include special characters or other punctuation marks.
- *Numeric* means the characters can be numbers only.
- *Alpha* means the characters are alphabetical only, but can include special characters or other punctuation marks.

Table 4.27 – Field Definitions

Field	Definitions
35-Day Gas Backflow Tamper	A numeric, one-digit code indicating tamper detection of gas backflow for R900G.
35-Day Gas Magnetic Tamper	A numeric, one-digit code indicating tamper detection of magnetic tamper for R900G.
35-Day Gas Removal Tamper	A numeric, one-digit code indicating tamper detection for removal of R900G.
35-Day Leak	A numeric, one-digit code indicating number of days that flow has not gone to zero.
35-Day Program Flag	A numeric, one-digit code indicating how many times the meter was programmed in the last 35 days.
Account Number	An alphanumeric, 20-character field used in identifying the customer account number. If the account number is less than twenty characters, the unused space is left blank. This unused space can also be used to display any other relevant account information and appears just as it is sent from the CIS utility billing system vendor.

Table 4.27 – Field Definitions (continued)

Field	Definitions
	Although the CIS utility billing system master file can include the route number as part of the account number, the N_SIGHT system reserves a field in the route header record for the route number. Therefore, the account number field, which is in each meter record, need only include the account number.
Account Status	An alphanumeric, four-character field indicating the current status of each account. These codes refer to four account status types, for example: • 'ACTI' = Active • 'INAC' = Inactive • 'AWZ' = Active Warn on Zero Usage • 'IWU' = Inactive Warn on Usage. These codes can be sent from the CIS utility billing system or created in N_SIGHT.
Additional Flags	A 69-character field for future growth.
Address 1	An alphanumeric, 26-character field containing the first line of the street name and assigned number of the residence.
Address 2	An alphanumeric, 26-character field additional address information.
AMR Read Type	A numeric, two-digit field indicating the AMR reading type, for example: 00 = Itron ERT 03 = R900 E-CODER 01 = Advantage 05 = R900 Gas 02 = R900 ProRead

Table 4.27 – Field Definitions (continued)

Field	Definitions
Collection ID	A numeric, 13-character field containing the unique identifier for the collection device (use 'spaces' if device provides no ID value). Indicates the MIU serial number.
Collector Reading	A 10-character field that contains the raw unadjusted reading that comes from the MIU.
Comment Code 1	An alphanumeric, four-character field containing a note or comments concerning the reading.
Comment Code 2	A second alphanumeric, four-character field containing a note or comments concerning the reading.
Company Code	An alphanumeric, four-character field used to define the entity governing the working regions and offices of a particular group of personnel. This also determines where cycles and routes are to be imported. The company must not change within a grouping of records in the import file.
Completion Date	A numeric, eight-digit field representing actual date the reading was taken. The date format is YYYYMMDD.
Consumption	An alphanumeric, six-character field indicating the amount of water or gas billed during the last billing cycle or for the overdue amount in a collection type.
Create Date	A numeric, eight-digit field representing the actual date the transfer file was created. The date format is YYYYMMDD.
CRLF	A carriage return, line feed. Each line should end with one of each of these in the last two positions.
Current Error Count	A numeric, one-digit field indicating error/tamper count for R900G.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Current Gas Backflow Tamper	A numeric, one-digit field indicating a tamper detection flag for no gas flow.
Current Leak	(E-CODER registers only). A numeric, one-digit field based on the total number of 15-minute periods of recorded consumption in the previous 24-hour period. • No Leak: 0 - 49 15-minute periods of recorded consumption • Intermittent Leak: 50 - 95 15-minute periods of recorded consumption • Continuous Leak: all 96 15-minute periods showing consumption
Current Gas Magnetic Tamper	A numeric, one-digit field indicating a tamper detection flag for gas magnetic tamper.
Current Gas Removal Tamper	A numeric, one-digit field indicating a tamper detection flag for gas removal.
Customer Address City	An alphanumeric, 26-character field indicating the city in which the customer address is located.
Customer Address House Number	An alphanumeric, seven-character field indicating the house number of the customer address.
Customer Address HSuffix	An alphanumeric, seven-character field indicating the house number suffix of the customer address.
Customer Address Predir	An alphanumeric, two-character field indicating direction: N, S, E, W, NE, NW, SE, SW.
Customer Address Postdir	An alphanumeric, two-character field indicating direction: N, S, E, W, NE, NW, SE, SW.
Customer Address SSuffix	An alphanumeric, four-character field indicating the street name suffix.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Customer Address State	An alphanumeric, two-character field indicating the two-letter state abbreviation code for the customer address.
Customer Address Street	An alphanumeric, 25-character field indicating the street of the customer address.
Customer Address Unit	An alphanumeric, 15-character field indicating the unit for the customer address.
Customer Address Zip	An alphanumeric, 11-character field indicating the postal zip code for the customer address.
Customer Contact	An alphanumeric, 26-character field that indicates the name of the contact person.
Customer Name	An alphanumeric, 26-character field that indicates the customer.
Customer Phone 1	An alphanumeric, 10-character field indicating the primary phone number for the customer.
Customer Phone 2	An alphanumeric, 10-character field indicating an additional phone number for the customer.
Cycle	An alphanumeric, four-character field used to identify a group of routes in the meter reading process. These routes can be grouped according to what period they are to be billed, and then assigned a cycle number. When using letters, only uppercase are valid.
Date	A numeric, 10-character field indicating the date the vehicle was used for meter reading. The valid format is YYYYMMDD.
Deactivate Date	A numeric, eight-character field that indicates the date that the route is to be deactivated in N_SIGHT after exporting.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Decimals	A numeric, two-digit field from 00-10 that determines the number of digits placed to the right of the decimal point on a meter reading. The value is generally set to a quantity greater than zero only when reading electric demand or electric probe meters. This field can be included in the CR read type code table record.
Dependent WO	An alphanumeric, 20-character field reserved for future use to link related orders together.
Description	An alphanumeric, 40-character field used to describe the company associated with the company code.
Dials	A numeric, two-digit field from 00-10 used in the Reading Detail Record indicating the number of digits expected for a meter reading. This information is used to audit the entered reading and to control the reading field size displayed on the handheld. For readings with a decimal, the number of dials does not include the decimal even though a decimal appears in the Read field on the handheld display. This field can be included in the CR read type code table record.
Display Digits	A numeric, one-digit field indicating the number of digits in the main reading display. This is the actual digit count, not the raw value of the R900 reading. For example, six digits has a value of six not the raw reading value of two.
Elapsed Time	A numeric, five-digit field representing the time in seconds that have elapsed since the reading was taken.
Email Address	An alphanumeric, 50-character field indicating the email address to be used for the account, which is passed over the N_SIGHT host software.

Table 4.27 – Field Definitions (continued)

Field	Definitions
End Miles	An alphanumeric, 10-character field used to track the ending miles of the vehicle used.
End Time	A numeric, four-digit field representing the end time entered for the metering reading. The timestamp format is HHMM.
Entry Date	A numeric, eight-character field for the date an order was created or placed into the computer system. The format is YYYYMMDD.
ERT Inversion Tamper	A numeric, one-digit field indicating a tamper detection flag for ERT inversion.
ERT Reverse Tamper	A numeric, one-digit field indicating a tamper detection flag for ERT removal.
ERT Type	An alphanumeric, two-character field indicating the type of ERT used.
Fatal Error	A numeric, one-digit field used to signal an error for an R900.
File Version	An alphanumeric, one-character field indicating the version of the N_SIGHT file format used.
Force Special Instruction	A Boolean, one-character field used to force the Special Instr field. This field displays notes as hazard if Y.
Force Special Instruction 2	A Boolean, one-character field used to force the Special Instr 2 field. This field displays notes as hazard if Y.
Freq Channel	An alphanumeric, four-character field used to identify the radio frequency of ERTs.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Gas No Flow	A numeric, one-digit field indicating a period for which there has been no gas flow: 0: < 7 Days 1: 7 - 14 Days 2: > 14 Days 3: Undefined
Handheld ID	An alphanumeric, 20-character field supplied by the utility to identify the device used for data capture.
Hazard Code	An alphanumeric, four-character code which identifies the hazard or warning, such as a code for electric fences or warnings of potential hazards.
Hazard Text	An alphanumeric, 26-character field which provides free-form information that is returned from the reader. It can contain additional directions to help locate the meter, act as a reminder for electric fences, warnings of hazards, etc.
High Limit	A numeric, 10-digit field that can be either left or right-justified and is assigned by the CIS utility billing system vendor. This field defines the highest meter reading that is expected to be captured at a particular account.
High Power	A numeric, one-digit field used as high versus low power indicator for all R900 meters.
Last Time Read	A numeric, 14-digit field that indicates the time on the meter clock when previously probed. (YYYYMMDDHHMMSS).

Table 4.27 – Field Definitions (continued)

Field	Definitions
Leak 35-Days	A numeric, one-character field indicating the code for the number of days there was evidence of a leak in the last 35 days. (E-CODER registers only.)
Low Limit	A numeric, 10-digit field that can be either left or right-justified and is assigned by the CIS utility billing system. This field defines the lowest meter reading that is expected to be captured at a particular account.
Mail Address 1	An alphanumeric, 26-character field describing the mailing address.
Mail Address HSuffix	An alphanumeric, seven-character field indicating the house number suffix of the mailing address.
Mail Address House Number	An alphanumeric, seven-character field indicating the house number of the mailing address.
Mail Address Predir	An alphanumeric, two-character field indicating direction: N, S, E, W, NE, NW, SE, SW.
Mail Address Postdir	An alphanumeric, two-character field indicating direction: N, S, E, W, NE, NW, SE, SW.
Mail Address Street	An alphanumeric, 26-character field indicating the street name of the mailing address.
Mail Address SSuffix	An alphanumeric, four-character field indicating the street name suffix.
Mail Address Unit	An alphanumeric, 15-character field indicating the unit for the mailing address.
Mail City	An alphanumeric, 26-character field indicating the city of the mailing address.
Mail Name	An alphanumeric, 26-character field indicating the name of the mailing address.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Mail Phone	An alphanumeric, 10-character field indicating the phone number for the mailing address.
Mail State	An alphanumeric, two-character field indicating the code for the state for the mailing address.
Mail Zip	An alphanumeric, 11-character field indicating the postal zip code for the mailing address.
Meter Condition Code 1	The first four-character, alphanumeric field used to identify the condition of the meter.
Meter Condition Code 2	The second four-character, alphanumeric field used to identify the condition of the meter.
Meter Custom 1	The first alphanumeric, 26-character field representing custom display for meter screens.
Meter Custom 2	The second alphanumeric, 26-character field representing custom display for meter screens.
Meter Install Date	A numeric, eight-digit field representing actual date the meter was installed. The date format is YYYYMMDD. Do not use zeros in this field
Meter Key	An alphanumeric, 20-character code to identify the meter within the premise_key. This code uses the meter number unless the CIS utility billing system has a better key.
Meter Location	An alphanumeric, four-character field that identifies where the meter or remote receptacle is located on a given property. Each code has a corresponding description. Examples of location codes are: BL = back left 01 = basement FR = front right These codes can be sent from the CIS utility billing system or they can be created in N_SIGHT.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Meter Manufacturer	An alphanumeric, three-character field used to identify the manufacturer of the meter.
Meter Number	An alphanumeric, 20-character field used to identify the meter. The meter number often consists of the meter serial number and/or a code which identifies the manufacturer.
Meter Size	An alphanumeric, eight-character field used to describe the size of the meter.
Meter UOM	An alphanumeric, three-character field used to identify the unit of measure for the meter.
Meter Type	An alphanumeric, four-character field used to describe an individual class of meter. A meter type defines both the method of reading and the specific register (Read type) of that meter. A single meter type cannot be specified for all meters unless they are all captured exactly the same way and have exactly the same register(s) attached. The capture method is defined in the meter type table. The register(s) on the meter is defined in the meter type/read type table
MIU Type	A numeric, two-digit code indicating the utility meter type: 01 = Gas 02 = Water 03 = Other
Multiplier Applied	A numeric, one-digit field for a flag that indicates if the multiplier of 10 is to be applied to the main reading to get the real engineering unit value.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Must Read Code	A Boolean, one-character field that must be 'Y' or 'N'. Indicates that the meter must be read (Y) or should not be read (N).
New Tamper 1	A numeric, one-digit field representing a value that, if changed on return to the CIS utility billing system, indicates inversion tamper on the meter.
New Tamper 2	A numeric, one-digit field representing a value that, if changed on return to the CIS utility billing system, indicates removal tamper on the meter.
No Flow Days	An alphanumeric, one-character E-CODER code indicating a four (4) for no flow days (or consecutive days with zero consumption).
Non_Fatal Error/Flags	A numeric, one-digit field defined by the meter manufacturer to signal no error for the R900 electric or gas meter.
Notes Back	An alphanumeric, 128-character field used to send notes back to the CIS utility billing system.
# Meters	An alphanumeric, six-character field indicating the total number of meters.
# Premises	An alphanumeric, six-character field indicating the total number of premises.
# Routes	An alphanumeric, six-character field indicating the total number of routes.
Office	An alphanumeric, four-character field. The office field is used to define the entity governing a working group of personnel. It also determines where cycles and routes are to be imported. The office must not change within a grouping of records in the import file.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Order Status	An alphanumeric, two-character field indicating the status of the order: IN = incomplete; CO = complete; SK = skipped
Peak Backflow	A numeric, one-character E-CODER code for peak backflow for the last 35 days. Defined as the highest amount of reverse flow in any 15-minute period during the past 35 days. The minimum and maximum values vary based on meter size and unit of measure. For example, the minimum value for a 5/8” T-10 gallon meter is 0.1 gallons and the maximum is 10 gallons. (E-CODER registers only.)
Permit	A Boolean, one-character field that must be ‘Y’ or ‘N’ to indicate a permit.
Premise Custom 1	An alphanumeric, 26-character area containing the first set of custom display fields for the premise.
Premise Custom 2	An alphanumeric, 26-character area containing the second set of custom display fields for the premise.
Premise Key	An alphanumeric, 20-character field that uniquely identifies the premise. Use the account number unless the CIS utility billing system vendor has a better key.
Prev Read	A numeric, 10-digit field assigned by the CIS utility billing system vendor. This field shows the meter reading for the previous billing period.
Prev Read Date	An alphanumeric, eight-character field assigned by the CIS utility billing system vendor. This field contains the month, day, and year that the previous reading was entered. Valid Format: YYYYMMDD

Table 4.27 – Field Definitions (continued)

Field	Definitions
Prev Tamper	A numeric, one-digit field used in the ERT Detail Record, representing a value that, if changed on return to the CIS utility billing system vendor, indicates inversion tamper on the meter.
Previous Error Count	A numeric, one-digit field used for R900 Gas tamper. Use '8' to suppress tamper check.
R900 Format	A numeric, two-digit field indicating the R900 reading format: 0 = Binary 1 = BCD 2 = "Data Stream" (not used) 3 = E-CODER 4 = MLOG
Read Code	An alphanumeric, two-character field indicating the type of read: • AH - Admin Hi Fail • AL - Admin Low Fail • AR - Admin Read • AU - Admin Inactive • AZ - Admin Zero Use • ER - External Read (Probe) • EF - External Failure (adds more for validation of radio & probe reads) • FC - Failure Read Compare • KA - Keyed Alpha • KH - Keyed High • KI - Keyed Inactive • KL - Keyed Low

Table 4.27 – Field Definitions (continued)

Field	Definitions
	• KN - Keyed, Negative usage • KR - Keyed Read • KV - Keyed Verified • KZ - Keyed Zero Consumption • RA - Radio Alpha Characters (::::::) • RH - Radio High Reading • RI - Radio Inactive • RL - Radio Low Reading • RN - Radio Negative Consumption • RR - Radio Read • RT - Radio Tamper • RV - Radio Verified • RZ - Radio Zero Consumption
Read Date	A numeric, eight-character field representing the date that the route is expected to be read. The date format is YYYYMMDD.
Read Direction	An alphanumeric, one-character field designating the direction the meter reading is input into the handheld. This field can be on of the following: R = Right L = Left C = Center Blank

Table 4.27 – Field Definitions (continued)

Field	Definitions
Read Instruction 1	An alphanumeric, four-character field that contains read instructions for the meter reader. Each code has a corresponding instruction code description. Certain codes can be designated as flash-and-beep or alert-and-hold to make the meter reader aware of the instruction attached to the meter. The system provides for two instruction codes per meter. Some examples include: GK = get key from neighbor LC = low ceiling KOG = keep off grass, etc. These codes can be sent from the CIS utility billing system vendor or they can be created in N_SIGHT. When using letters, only uppercase is valid.
Read Instruction 2	A second alphanumeric, four-character field for read instructions. See Read Instruction 1.
Read Sequence	A numeric, six-digit field, mandatory, right-justified, and zero-filled. This field, assigned by the CIS utility billing system, determines the order in which multiple meters at one account are to be read. All records are indexed based upon the combination of data in the Pg (Page) (priority 1 index) and the ReadSeq (priority 2 index) fields.
Read Type	An alphanumeric, four-character field that describes the details of a particular register. Examples: HIGH, LOW, GAL, CFT, WTR, and GAS.

Table 4.27 – Field Definitions (continued)

Field	Definitions
	It is important to note that a six-digit register and a four-digit register should have different Read Types if they are to be processed differently by the system. Read Types must match the values specified for the meter type because the import file does not override the association defined in the meter type/read type table.
Reader ID	An alphanumeric, 20-character field identifying the reader used.
Reading	An alphanumeric, 10-character field assigned by the meter reader into the handheld. This field shows the meter reading that was recorded.
	Meter readings are usually left-justified if the following conditions exist. • ReadDir = L or R Meter readings are normally right-justified if the following conditions exist. • ReadDir = C • The right justify meter reading parameters in the PC software in system setup is enabled. This particular adjustment takes place during unloading the handheld. Therefore, the setting applies to all meter readings but does not affect readings while they are being collected in the handheld.
Record ID	An alphanumeric, five-character field used to define the type of header or detail record. The record IDs set by N_SIGHT cannot be changed by the utility.
Re-entry Count	A numeric, two-character field indicating the number of different reads entered.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Reed Switch Failure Flag	A numeric, one-digit code indicating a reed switch for R900G.
Register Manufacturer	An alphanumeric, 25-character field used to identify the manufacturer of the register.
Register Install Date	A numeric, eight-digit field representing actual date the register was installed. The date format is YYYYMMDD.
Register ID	An alphanumeric, 10-character field indicating the unique register identifier.
Route	An alphanumeric, 10-character field assigned by the CIS utility billing system vendor identifying the route or book to which an account belongs. Any unused character positions to the right of this field must be defaulted to spaces. These must be left-justified, blank-filled in this field. “Found meters” are accounts that can be added by the meter reader.
Route Message	An alphanumeric, 80-character field used for free-form statements that are downloaded to the handheld for a particular route. The message is displayed on the handheld when the meter reader begins the route.
Seal Number	An alphanumeric, 10-character field used to prompt the meter reader to verify the Seal ID. This option can be sent from the CIS utility billing system vendor or selected through N_SIGHT.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Skip Code	An alphanumeric, four-character field used only in CS skip code table record. The Skip Code field contains a code entered on the handheld by the meter reader to explain why a meter reading was not obtained at a particular account. Each code identifies a specific reason such as NOAC=no access, DOG=bad dog, etc. The skip code is displayed in the reading field on the handheld with a prefix of “SK” followed by the 1 to 4 character skip code. Example: SKDOG or SKNOAC
Special Instruction 1	An alphanumeric, 300-character field that contains account instructions for the meter reader. Each code has a corresponding instruction code description. Certain codes can be designated as flash-and-beep or alert and hold to make the meter reader aware of the instruction attached to the meter. The system provides for two instruction codes per meter. Some examples include, GK=get key from neighbor, LC=low ceiling, KOG=keep off grass, etc. These codes can be sent from the CIS utility billing system vendor or they can be created in N_SIGHT. When using letters, only uppercase is valid.
Special Instruction 2	A second alphanumeric, 300-character field for special instructions. See Special Instruction 1.
Start Miles	An alphanumeric, 10-character field used to begin tracking the starting miles of the vehicle used.
Start Time	A numeric, four-digit field representing the start time entered for the meter reading. The timestamp format is HHMM.

Table 4.27 – Field Definitions (continued)

Field	Definitions
Timestamp	A numeric, six-digit field representing the time the account was read by the meter reader or modified by the N_SIGHT host PC operator. The timestamp format is HHMMSS.
Tone	An alphanumeric, one-character field that indicates the tone used for reads.
Trouble Code Description	An alphanumeric, 20-character field used only in the CT trouble code table record describing the corresponding trouble code. These descriptions can be sent from the CIS utility billing system vendor or created in N_SIGHT.
Trouble Type	An alphanumeric, one-character field used only in the CT trouble code table record indicating a particular trouble type for the corresponding trouble code. These types can be sent from the CIS utility billing system or sent through N_SIGHT.
Utility Pass Through	An alphanumeric, 128-character field assigned by the CIS utility billing system vendor. This field contains utility-defined data such as the account number, meter size, previous reading, etc. The Utility Pass thru field is limited to printable characters and no carriage return or line feed is allowed. This data is not transferred into the handheld.
	Do not place any data that the meter reader needs in the Utility Field. They do not have access to the data in this field.
Vehicle Detail	Multiple records exported if vehicle information is captured. The VHLDT records are not associated to a particular route. (Export field only.)

Table 4.27 – Field Definitions (continued)

Field	Definitions
Vehicle ID	An alphanumeric, 20-character field identifying the vehicle used for meter reading.
Voltage	A numeric, three-digit field indicating operating meter voltage.
Water No Flow 35-Days	A numeric, one-character field indicating the consecutive days of no consumption detected in the last 35 days. (E-CODER registers only.)
Xcoord	A numeric, 12-character field indicating longitude (x-coord). Required that coordinates be provided in decimal format.
Ycoord	A numeric, 12-character field indicating latitude (y-coord). Required that coordinates be provided in decimal format.

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Chapter 5: AMI System Propagation Analysis

A propagation study helps in the deployment planning for your AMI system. Reliable transmission range is crucial to the operation of a properly designed network. Neptune utilizes sophisticated propagation modeling incorporating the specific variables for the utility's coverage area to determine the optimum infrastructure placement. Propagation modeling incorporates such factors as geographic and topographic parameters of the endpoint locations and proposed collector sites. After the modeling is complete, a proposal is discussed with the utility outlining implementation and infrastructure requirements.

Overview

This chapter explains in detail the steps needed to prepare for the propagation analysis and how this helps your initial site visit and project deployment.

- **Propagation Analysis Request Form** — provides electronic list of customer service locations, suggested antenna location details, and environmental factors. It also requires other site detail information, such as other RF systems used by utility and antenna location details. See "Propagation Analysis Request Form" on page C-4.
- **Fixed Network Questionnaire**— includes contact information for the utility project manager, installation crews, IT department, and system configuration. See "Sample Fixed Network Questionnaire" on page C-2.
- **Propagation Study Results and Customer Presentation** — includes color-coded map of coverage, percent of services covered, and suggested number of R450 DCs, R450 MCs, or R900 Gateways.
- **FCC Approval** — includes applying for the license. The Neptune R450 System operates on a licensed frequency in the 450 to 470 MHz band. Approval is granted by the FCC or Industry Canada and includes searches for available frequencies and the application.

Systems located near the US/Canadian border require coordination and approval from both countries, and as a result, the process can take longer.

Propagation Analysis

The Propagation Analysis Request Form includes an electronic list of customers, suggested antenna and DC location details, and environmental factors. The following list describes the main characteristics of a propagation analysis.

- Provides preliminary look at the utility account area to determine the extent of system coverage.
- Includes terrain characteristics, land usage, customer meter locations, and antenna sites.
- Provides predicted coverage areas.

The propagation analysis involves the following:

- Completing the Propagation Analysis Request Form.
- Providing an electronic list of customers.
- Recommending or suggesting antenna locations (including heights).
- Providing restrictions for height, wind, permitting, airport, AM towers, etc.
- Providing details on what other RF equipment is mounted on the antenna site; for example, SCADA; can potentially affect system performance.
- Finding out other RF systems used by the utility to minimize interference.
- Seeking information for the antenna location. Antenna location can be important on a tower.

After the Form is Completed

The following list describes what happens after the Propagation Analysis Form is completed and sent to the System Propagation team.

- Service location coordinates provided can be imported directly to software.
- Service location addresses provided must be geocoded to latitudes and longitudes for importing into software.
- Service location boundary is created around the location points.
- Terrain and clutter data is selected for area.
- GIS Map (streets) data is selected.
- Data is loaded into the propagation analysis software.
- Antennas are located.
- Calculations and analysis are performed.
- Furnished proposed site locations/antennas assets are imported with provided structure heights.
- Areas without asset locations have FIND locations placed to assist utility with property acquisition.
- Calculations and analysis are performed to determine predicted service coverage at desired levels.
- Presentation and results are returned to Neptune Sales Contact (Territory Manager).
- The propagation can be revised if new information is determined at a later date. This is often needed as proposed site locations/antenna locations are evaluated.

Identifying all utility assets (especially towers and tanks) early in process can help to reduce the number of revisions on the propagation. After the propagation study and project award, the Fixed Network questionnaire helps to start the project and get a Neptune Customer Service representative assigned.

- Site Surveys process is important to confirm all collector locations and heights are available.

FCC Licensing (R450 Only)

The R450 System components are approved by the FCC as Part 90 components and must operate under an FCC license (due to the high power transmitter). Neptune secures the FCC license based on a frequency determined to be the best for the coverage area and transfers the license to the utility upon request.

Neptune utilizes a legal firm that specializes in application submission and procurement of FCC licenses for approved frequencies. Neptune provides this service to the customer free of charge. This process usually takes four weeks from the time the necessary information is compiled to complete the application. When the project award is made to Neptune, Neptune works with the utility to obtain the appropriate authorization to have the license transferred to the utility. The utility is responsible for future renewals of the license (usually every 10 years).

Chapter 6: Installing N_SIGHT Software Suite

This chapter provides instructions on how to install N_SIGHT and N_SIGHT PLUS. It describes the types of custom setups available and the basic installation instructions for the host software. It also includes hardware and software specifications and installation preparation tips. In addition, this guide presents a brief overview of the applications as well as how to use the N_SIGHT and N_SIGHT PLUS Help systems.

Custom Setups

Neptune offers several custom setup options that determine the type of installation you choose.

Table 6.1 – Custom Setup Options

Custom Setup	Type of Installation	Description
N_SIGHT Host Desktop	AMR only	Supports handhelds and mobile devices only.
N_SIGHT Host Client N_SIGHT Host Server	AMR only	Supports mobile devices, R900 Gateway v3s, and CMIU, Cello devices.
N_SIGHT PLUS Host	AMI only	Supports R450 DCs and R450 MCs with direct CIS interface using N_SIGHT v2 - v4 file format. Supports N_SIGHT v4 import file format only with R450 Collectors and R900 Gateways (v3, v4), CMIU, CELLO, but no mobile devices
N_SIGHT and N_SIGHT PLUS Host	AMR and AMI	Supports handhelds, mobile devices, R450 DCs and R450 MCs, and R900 Gateways.

Before installing the software, read this guide carefully to familiarize yourself with the following requirements.

- "N_SIGHT Host Software Requirements" on page 2-13.
- "N_SIGHT PLUS Host Software Requirements" on page 2-18.

Then, follow the specific procedures to perform the appropriate post-installation setup.

- See Chapter 2, “Setting Up N_SIGHT” of the *N_SIGHT™ Software Suite Getting Started Guide*, included with the N_SIGHT Software Suite CD.
- See Chapter 3, “Setting Up N_SIGHT PLUS” of the *N_SIGHT™ Software Suite Getting Started Guide*, included with the N_SIGHT Software Suite CD.

Installing N_SIGHT Software Suite

This section provides instructions for installing N_SIGHT, N_SIGHT PLUS host software on a server, or the installation of both.

If Neptune is hosting your N_SIGHT PLUS host software, you do not need to complete these installation procedures. However, if Neptune is not hosting your N_SIGHT PLUS host software, complete the instructions in this section to install the host software.

Beginning the Installation

To install the host software, complete the following instructions.

1. Insert the N_SIGHT Software Suite USB storage drive or installation media into your computer.

2. Browse and navigate to the drive where the installation files are located.

   Three items appear:

   - |SSetupPrerequisities
   - utilities
   - setup.exe

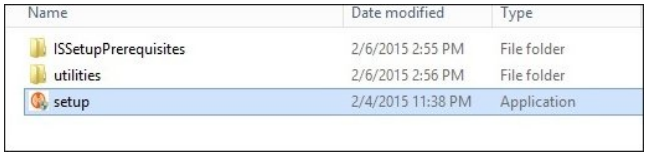

Figure 6.1 – Host Folder

3. Right-click **setup.exe**, and select **Run as administrator** for Windows Server 2012 Standard/R2 and Windows Server 2016 Standard.

   The following window appears.

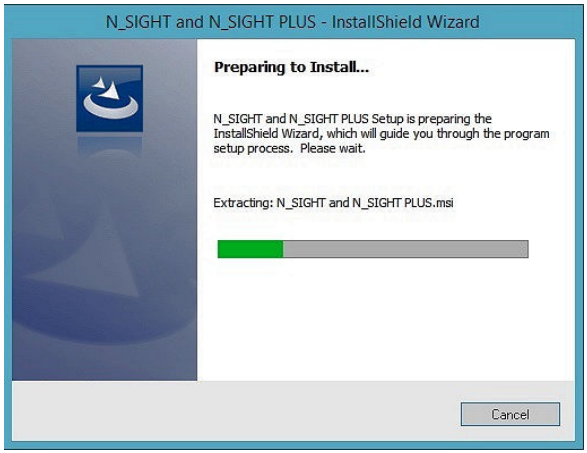

Figure 6.2 – InstallShield Wizard

After the setup files are extracted, the Welcome window appears.

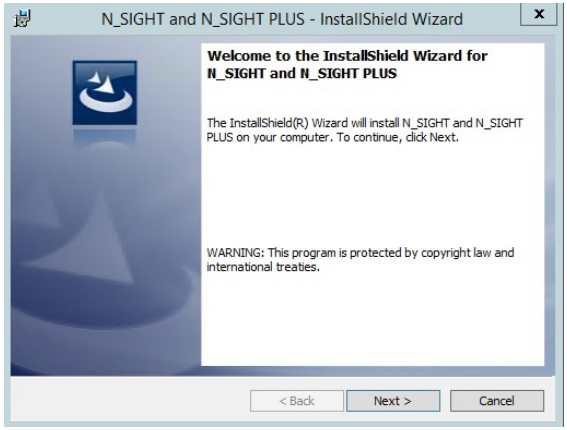

Figure 6.3 – Host Welcome Window

4. Click **Next**.

   The License Agreement window appears.

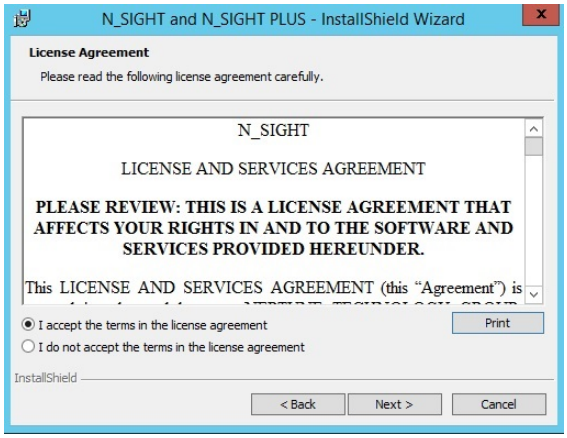

Figure 6.4 – License Agreement

5. Read the **License Agreement carefully**, and select **"I accept the terms in the license agreement"** radio button.

You can print the license agreement to read in its entirety and keep a copy for your records by clicking **Print**.

If you do not accept the terms of the license agreement, you cannot continue with the installation.

6. Click **Next**.

   The Customer Information window appears.

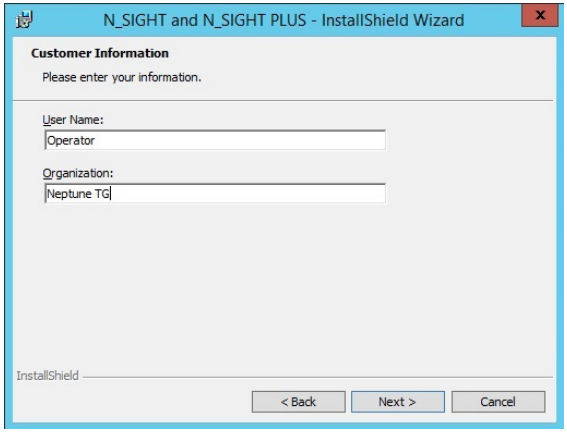

Figure 6.5 – Customer Information

7. Enter the following information:
   - User Name
   - Organization

8. Click **Next**.

   The Custom Setup window appears.

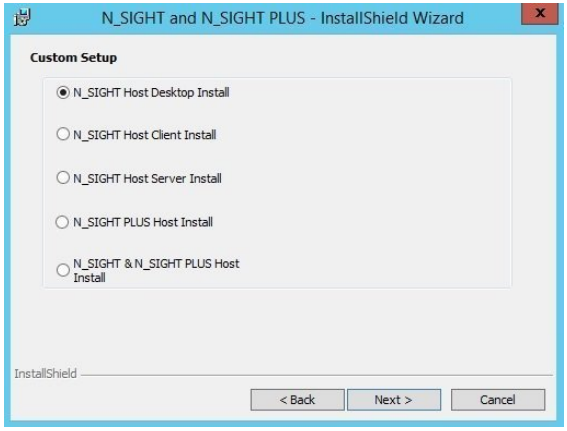

Figure 6.6 – N_SIGHT Software Suite Custom Setup

There are five options for the Custom Setup.

- N_SIGHT host desktop installation. See "N_SIGHT Host Desktop Installation" on page 6-7.
- N_SIGHT host client installation. See "N_SIGHT Host Desktop Installation" on page 6-7.
- N_SIGHT host server installation. See "N_SIGHT Host Server Installation" on page 6-16.
- N_SIGHT PLUS host installation. See "Installing N_SIGHT PLUS Host Software" on page 6-21.
- N_SIGHT and N_SIGHT PLUS host installation. See "N_SIGHT and N_SIGHT PLUS Host Server Installation" on page 6-49

Choose the appropriate option according to your needs as outlined in Table 6.1 on page 6-1.

Installing N_SIGHT Host Software

The following section provides instructions for the custom setup of N_SIGHT on desktop, client, and server computers.

N_SIGHT Host Desktop Installation

Complete the following instructions for installing the N_SIGHT host software on a desktop, standalone computer.

1. Complete all the steps for "Beginning the Installation" on page 6-2.
2. On the Custom Setup Window, select **N_SIGHT Host Desktop Install**. See Figure 6.6 on page 6-6.
3. Click **Next**.

   The Change Current Destination Folder for your DATABASE window appears.

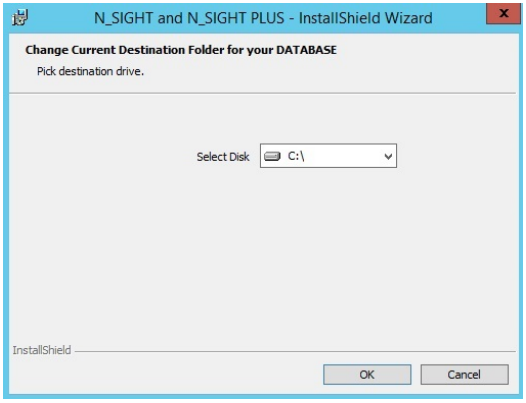

Figure 6.7 – Change Current Destination Folder

4. Select the drive with the most free space and install your database.
5. Click **OK** and the Change Current Destination Folder for your Major PROGAMS window appears. See Figure 6.15 on page 6-12.

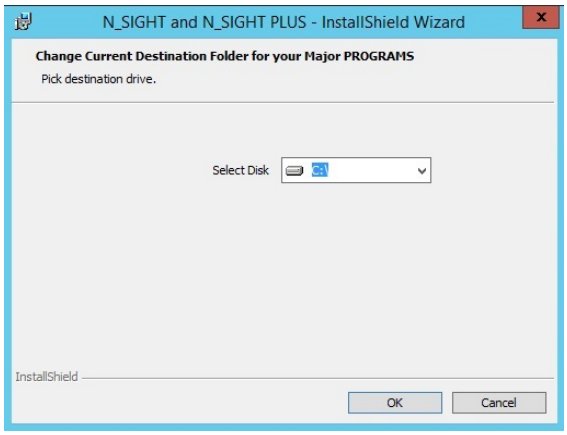

Figure 6.8 – Destination Folder for Major PROGRAMS

6. Select a drive where the program can reside.
7. Click **OK**.

   The Ready to Install the Program window appears. See Figure 6.9.

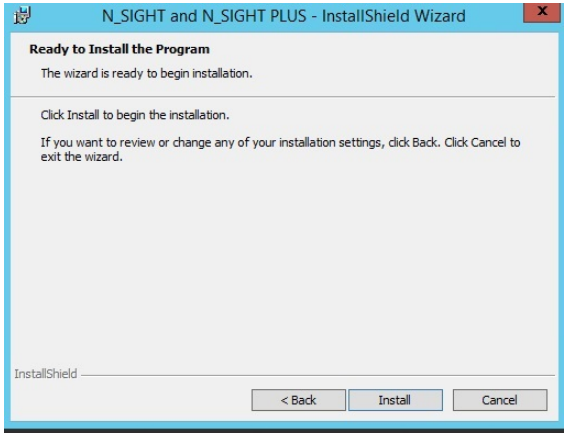

Figure 6.9 – N_SIGHT Desktop Ready to Install Window

8. Click **Install.**

The Installing N_SIGHT and N_SIGHT PLUS window appears.

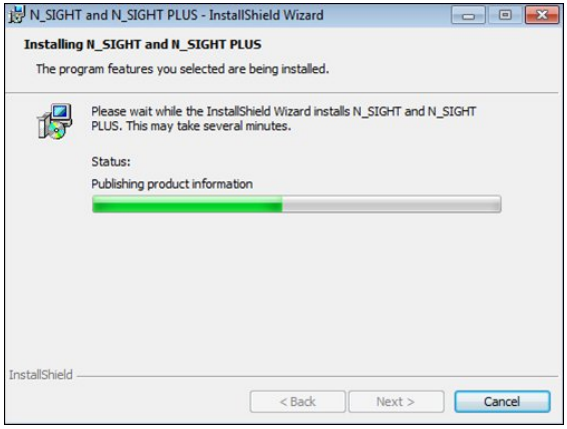

Figure 6.10 – Installing N_SIGHT and N_SIGHT PLUS

The installation process takes several minutes.

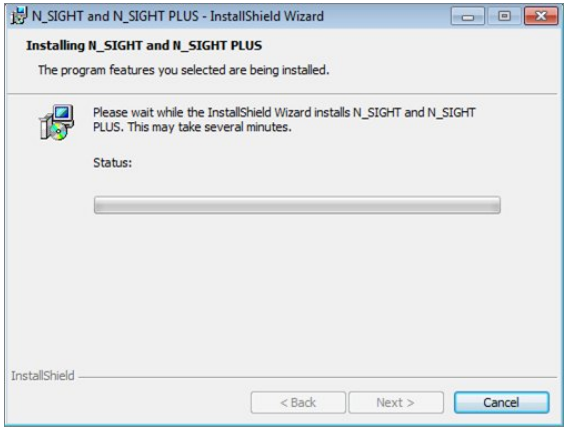

Figure 6.11 – Installing N_SIGHT Programs

When the N_SIGHT desktop installation is complete, the following window appears. See Figure 6.12.

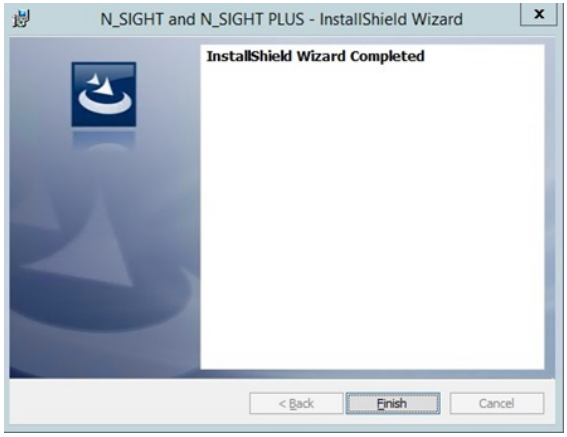

Figure 6.12 – N_SIGHT Desktop Installation Completed

9. Click **Finish**.

   The following prompt appears to restart your computer.

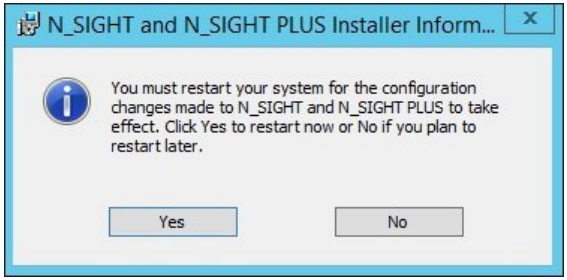

Figure 6.13 – Restart Prompt

10. Click one of the following.
    - **Yes**, to restart your computer.
    - **No**, if you plan to restart your computer later.

N_SIGHT Host Client Installation

Complete the following instructions for installing the N_SIGHT host software on a client.

1. Complete all the steps for "Beginning the Installation" on page 6-2
2. On the Custom Setup window, select **N_SIGHT Host Client Install.** See Figure 6.14**.**

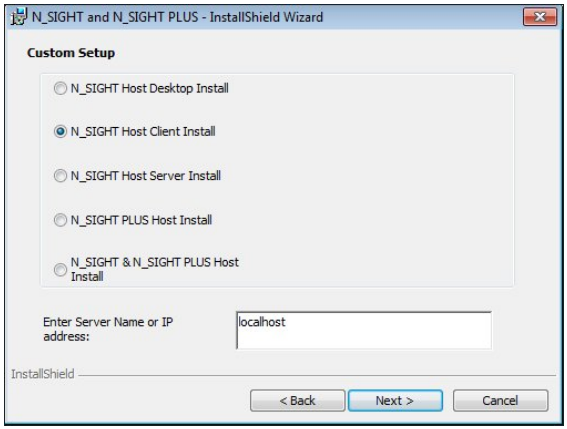

Figure 6.14 – Custom Setup N_SIGHT Host Client Install

The N_SIGHT and N_SIGHT PLUS window expands to include a server name or IP address.

3. Enter the server name or IP address.
4. Click **Next**.

The Change Current Destination Folder for Your Major PROGRAMS window appears. See Figure 6.15 on page 6-12.

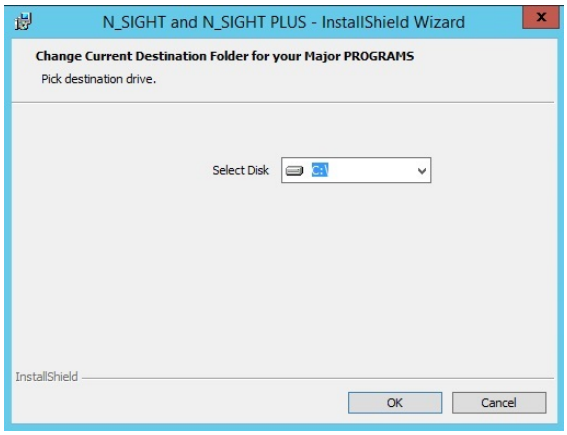

Figure 6.15 – Destination Folder for Major PROGRAMS

5. Select the drive where the program can reside.
6. Click **OK**.

   The Path location of the N_SIGHT host software appears.

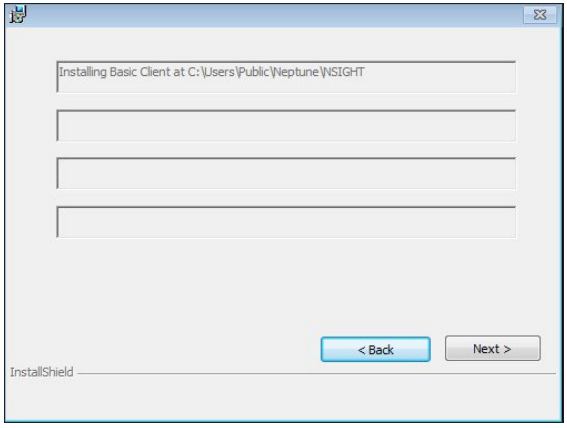

Figure 6.16 – N_SIGHT Path Location

7. Click **Next** to continue.

Installing the Software

Complete the following steps to continue with the installation.

1. Click **OK**.

   The Ready to Install the Program window appears.

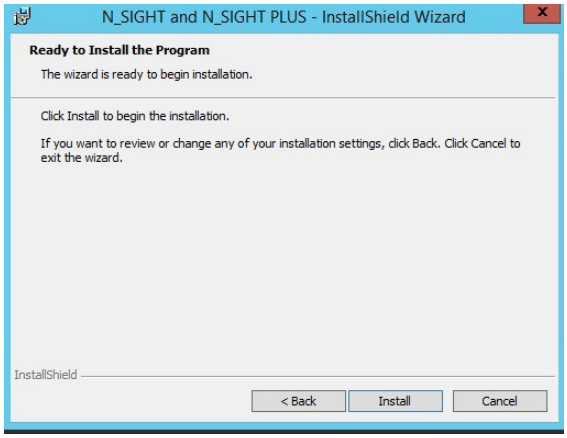

Figure 6.17 – N_SIGHT Client Ready to Install

2. Click **Install**.

   The installing Sybase SQL Anywhere status appears. See Figure 6.18 on page 6-14.

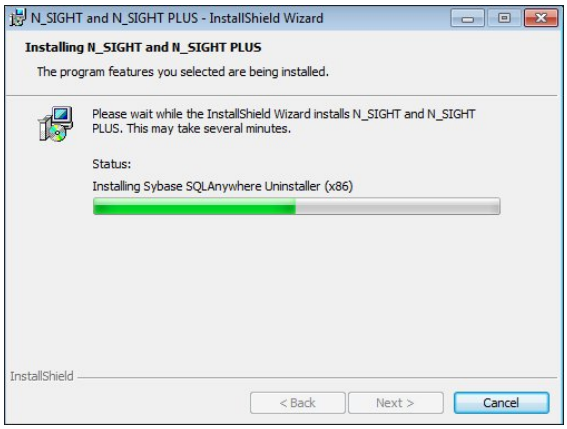

Figure 6.18 – Installing Sybase SQL Anywhere Status

The installation process takes several minutes. When Sybase SQL Anywhere has been installed, the N_SIGHT client installation status appears.

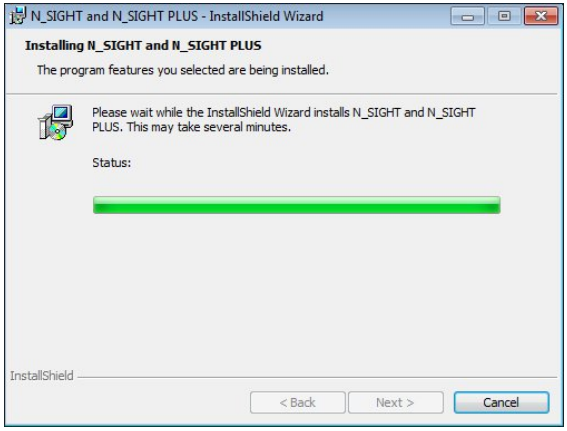

Figure 6.19 – N_SIGHT Client Installation Status

When the N_SIGHT desktop installation is complete, the following window appears. See Figure 6.20.

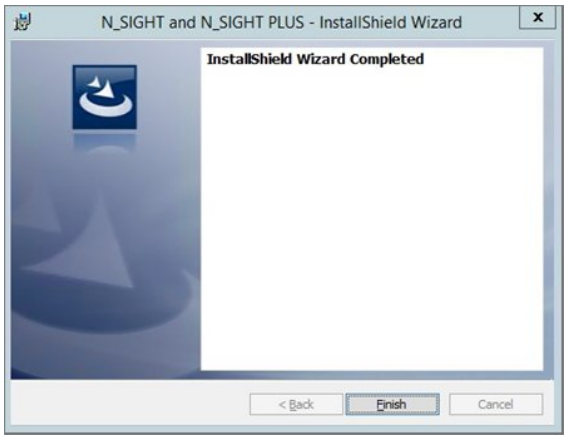

Figure 6.20 – N_SIGHT Client Installation Completed

3. Click **Finish**.

   The following prompt appears to restart your computer.

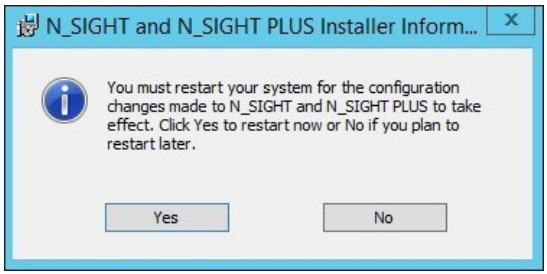

Figure 6.21 – Restart Prompt

4. Click one of the following:
   - **Yes**, to restart your computer.
   - **No**, if you plan to restart your computer later.

N_SIGHT Host Server Installation

Complete the following instructions for installing the N_SIGHT host software on a server.

1. Complete all the steps for "Beginning the Installation" on page 6-2.
2. On the Custom Setup window, select **N_SIGHT Host Server Install.** See Figure 6.6 on page 6-6.
3. Click **Next**.

   The Change Current Destination Folder for Your DATABASE window appears.

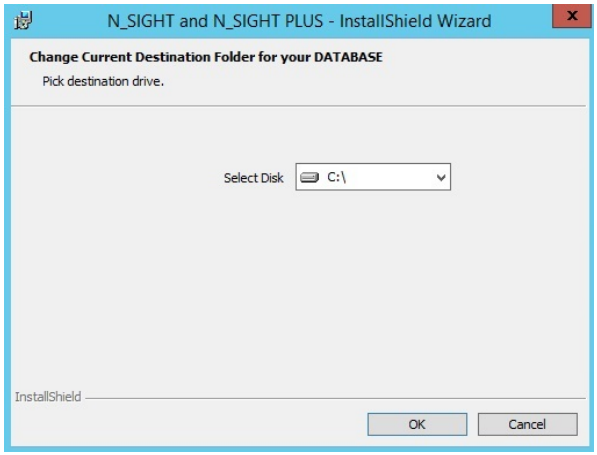

Figure 6.22 – Destination Folder for N_SIGHT Database

4. Select the drive where the database resides.
5. Click **OK**.

   The Change Current Destination Folder for Your Major PROGRAMS window appears. See Figure 6.23 on page 6-17.

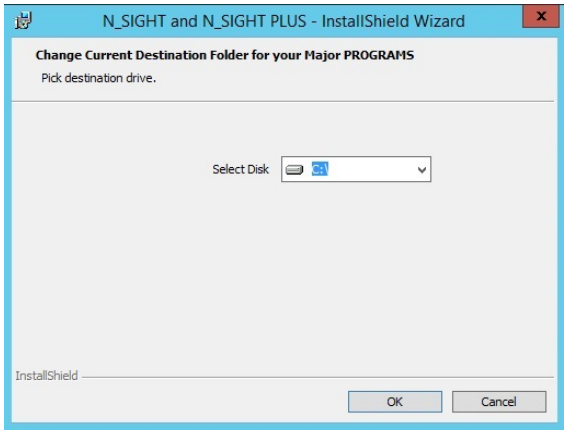

Figure 6.23 – Destination Folder for Major PROGRAMS

6. Select the drive where the programs can reside.
7. Click **OK** and the following window appears.

   The path location for the N_SIGHT host server programs appears. See Figure 6.24.

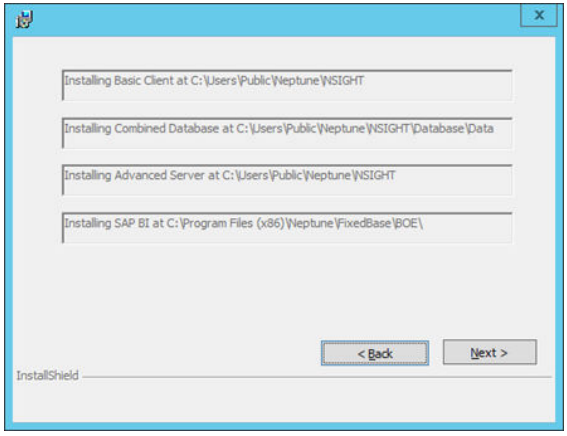

Figure 6.24 – N_SIGHT Path Location for Programs

Installing the Software

Complete the following steps to continue with the installation.

1. Click **Next** to continue.

   The Ready to Install the Program window appears. See Figure 6.25.

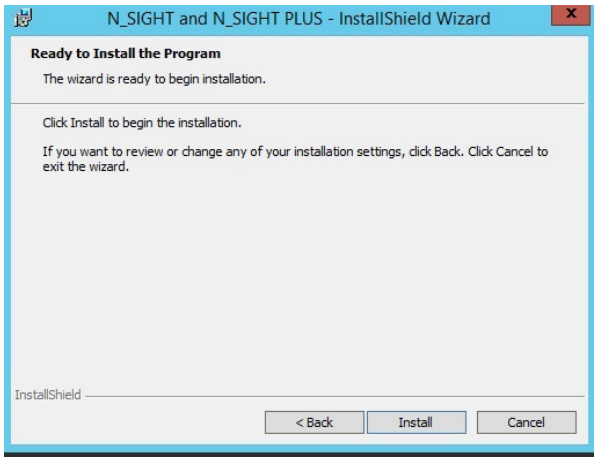

Figure 6.25 – N_SIGHT Client Ready to Install

2. Click **Install**.

   The Installing N_SIGHT and N_SIGHT PLUS window appears. See Figure 6.26 on page 6-19.

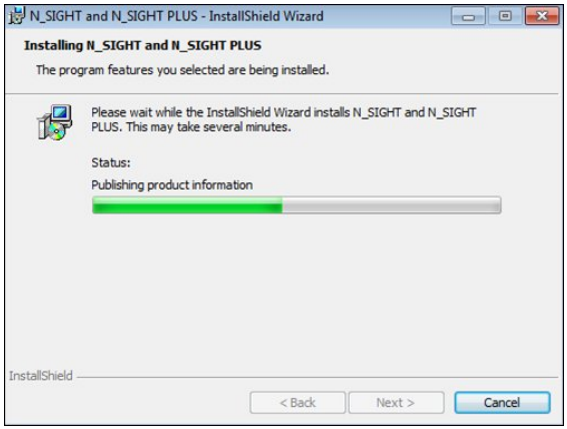

Figure 6.26 – Publishing N_SIGHT Product Information

The installation process takes several minutes.

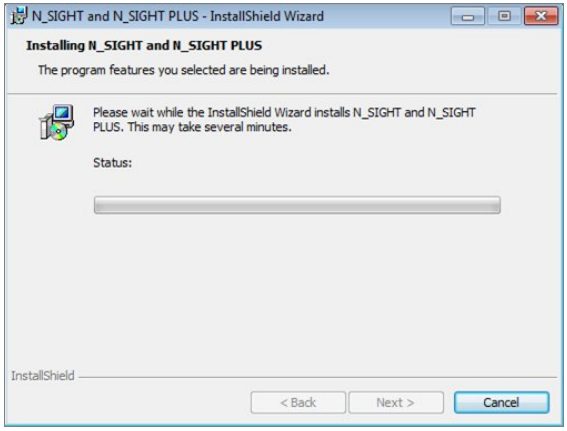

Figure 6.27 – Installing N_SIGHT Server

When the N_SIGHT server installation is complete, the following widow appears.

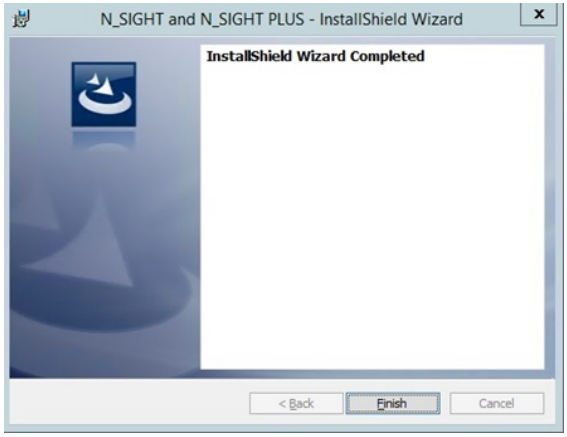

Figure 6.28 – N_SIGHT Server Installation Completed

3. Click **Finish**.

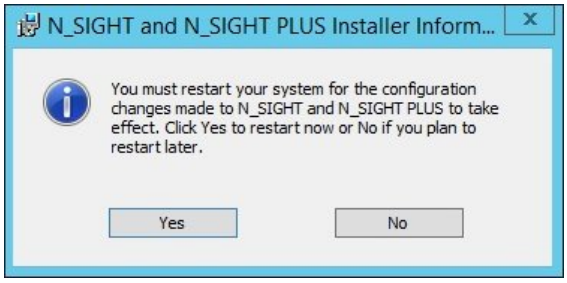

Figure 6.29 – Restart Prompt

4. Click one of the following:
   - **Yes**, to restart your computer.
   - **No**, if you plan to restart your computer later.

Installing N_SIGHT PLUS Host Software

This section provides instruction for installing the N_SIGHT PLUS host software on a server.

There are two prerequisites to complete prior to installing on a Windows Server 2012 Standard/RS or Windows Server 2016 Standard.

- Validate that all the required and optional Windows updates have been installed.
- Install NET Framework 3.5.

N_SIGHT PLUS Host Server Installation

Complete the following instructions for installing the N_SIGHT PLUS host software on a server.

1. Complete all the steps for "Beginning the Installation" on page 6-2.
2. On the Custom Setup window, select **N_SIGHT PLUS Host Server Install**. See Figure 6.6 on page 6-6.
3. Click **Next**.

   The Change Current Destination Folder for Your DATABASE window appears. See Figure 6.30 on page 6-22.

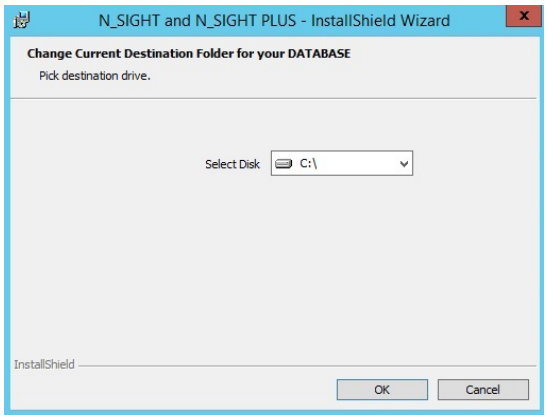

Figure 6.30 – Change Current Destination Folder

4. Select the drive with the most free space where you want to install your database.
5. Click **OK** and the Change Current Destination Folder for your Major PROGRAMS window appears. See Figure 6.31.

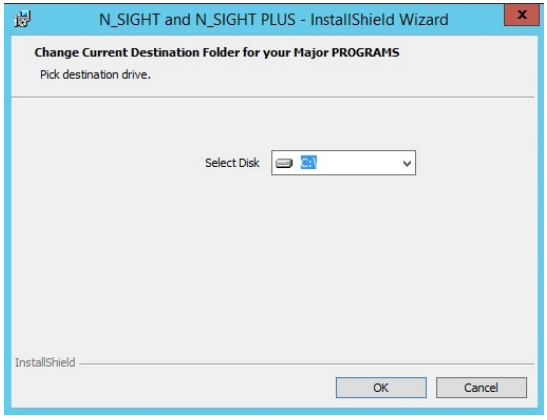

Figure 6.31 – Destination Folder for Major PROGRAMS

6. Select the drive where the program can reside.

Installing the Software

Complete the following steps to continue with the installation.

1. Click **OK** and the following window appears.

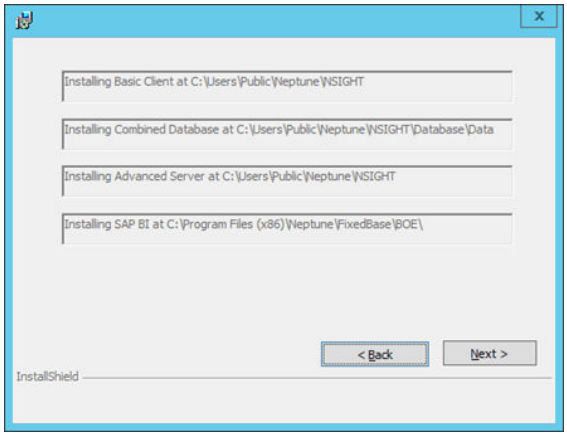

Figure 6.32 – Programs to be Installed

2. Click **Next**.

   The Ready to Install the Program window appears.

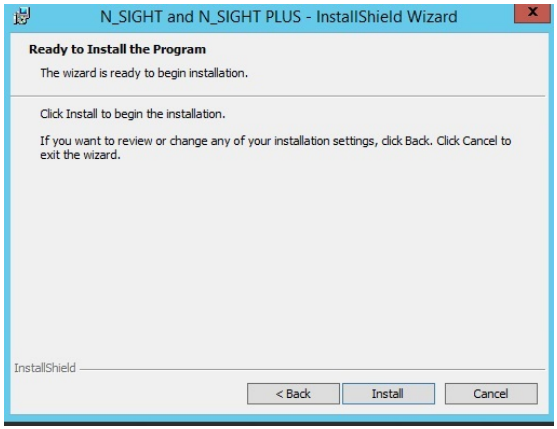

Figure 6.33 – Ready to Install Window

3. Click **Install**.

   The installation process takes several minutes. The Installing N_SIGHT and N_SIGHT PLUS window appears.

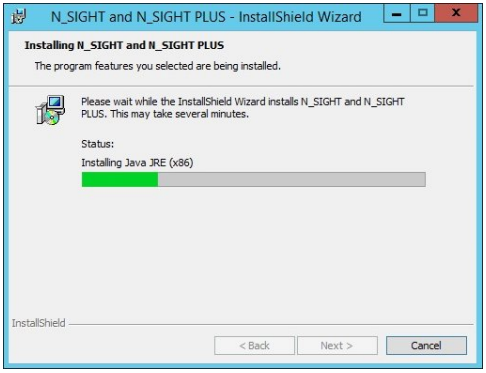

Figure 6.34 – Installing N_SIGHT PLUS Programs

4. When the installation is complete, click **Next**.

   The install performs a prerequisite check. The following dialog appears.

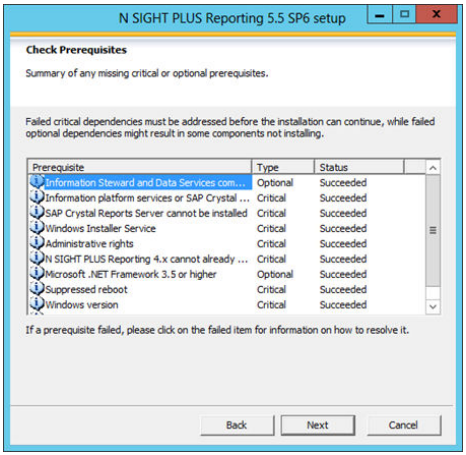

Figure 6.35 – N_SIGHT PLUS Prerequisite Check

5. If an item fails, select it to view information on how to resolve the failed check.

If an item fails, be sure to cancel this window and exit setup when prompted. If you continue the install, the installation is broken.

Installing the Reporting Module

This section provides instructions on installing the report module.

1. Click **Next** and the following window appears. See Figure 6.36.

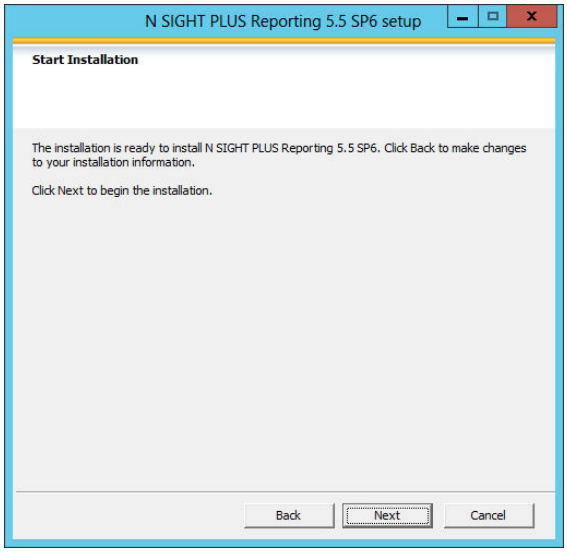

Figure 6.36 – N_SIGHT PLUS Reporting Setup

2. Click **Next** to begin installing the reporting module. See Figure 6.37 on page 6-26.

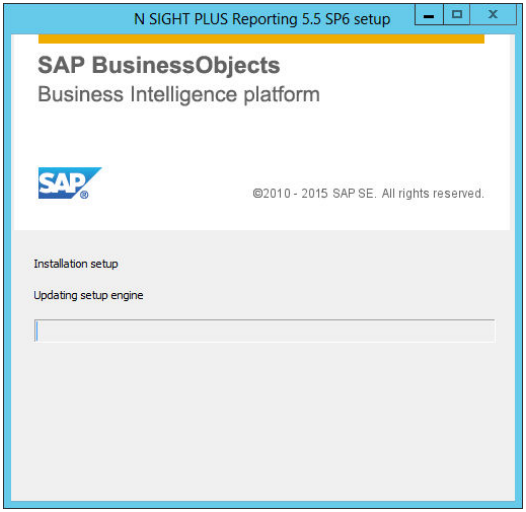

Figure 6.37 – SAP BusinessObject - Reporting

3. After the reporting module successfully installs, click **Next**.

   The Post Installation Steps window appears.

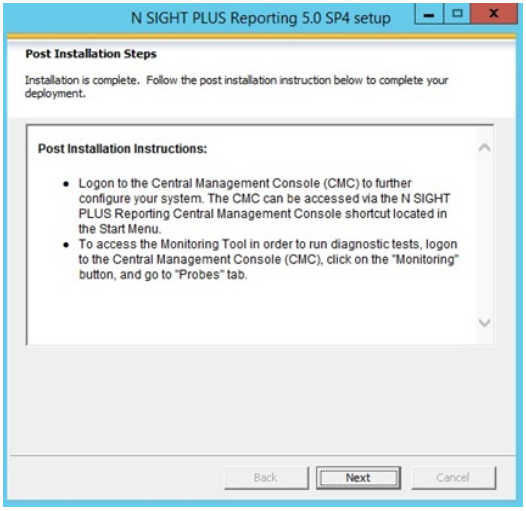

Figure 6.38 – Post Installation Steps

4. After reading the post installation instructions, click **Next**.

   The following window appears.

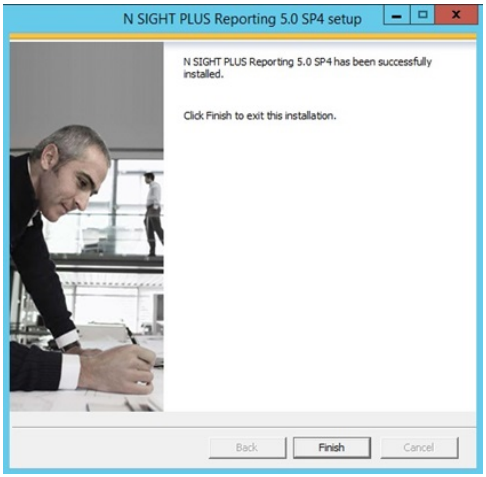

Figure 6.39 – Reporting Installation Complete

5. Click **Finish** to exit the reporting installation.

   The installation continues. A DOS window appears while the status bar on the InstallShield wizard continues.

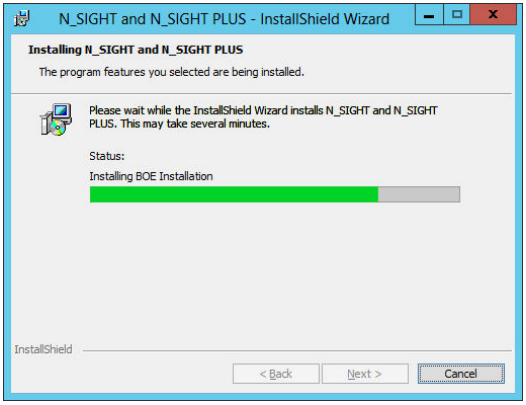

Figure 6.40 – Installing the BOE

When this installation completes, the following dialog appears.

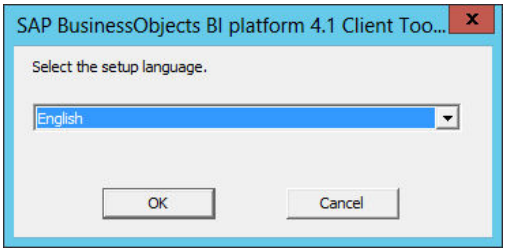

Figure 6.41 – Selecting the Setup Language

6. Validate that English is the language selected.
7. Click **OK**.

   The Check Prerequisites window appears.

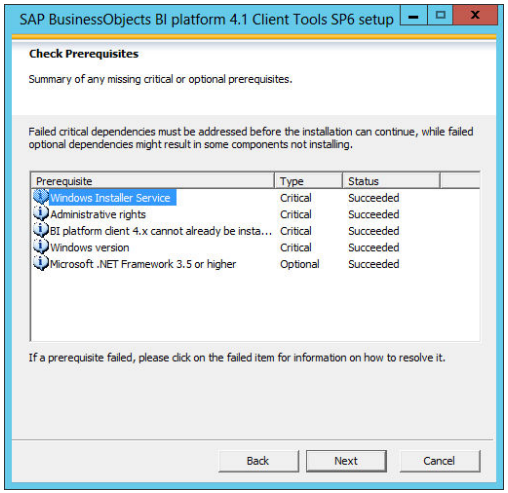

Figure 6.42 – Check Prerequisites Window

7. Click **Next**.

   The SAP BusinessObjects BI Platform Client Tools Setup wizard appears.

Completing the Client Tools Setup

Complete the following steps.

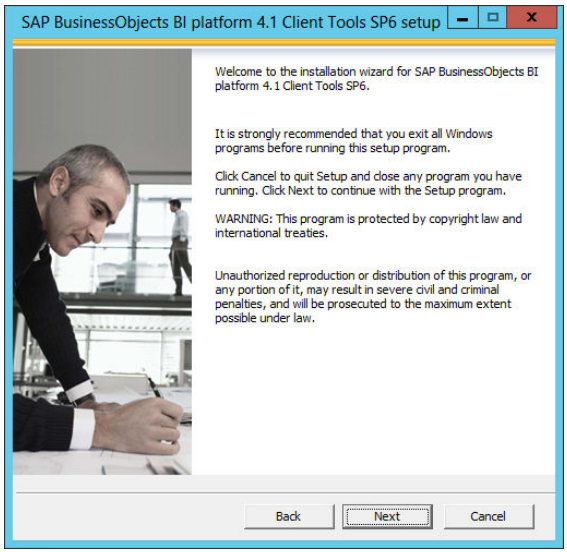

Figure 6.43 – Platform Client Tools Setup

1. Click **Next**.

   When the installation is complete, the license agreement appears. See Figure 6.44 on page 6-30.

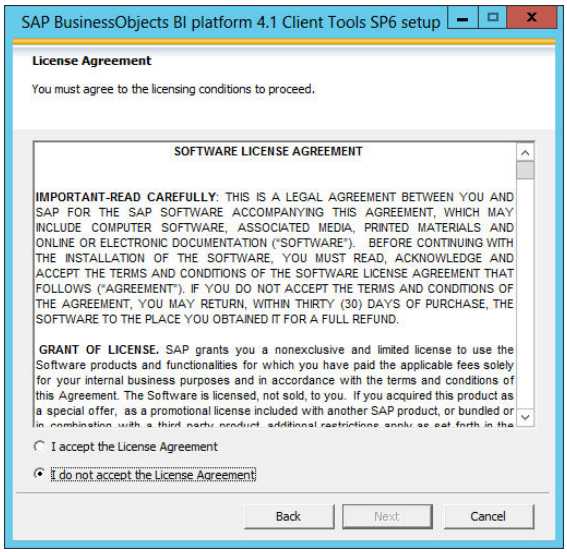

Figure 6.44 – License Agreement

2. Read the License Agreement carefully, and select **"I accept the terms in the license agreement."**

If you do not accept the terms of the license agreement, you cannot continue with the installation.

3. Click **Next**.

   The SAP BusinessObjects Select Language Packages window appears. See Figure 6.45 on page 6-31.

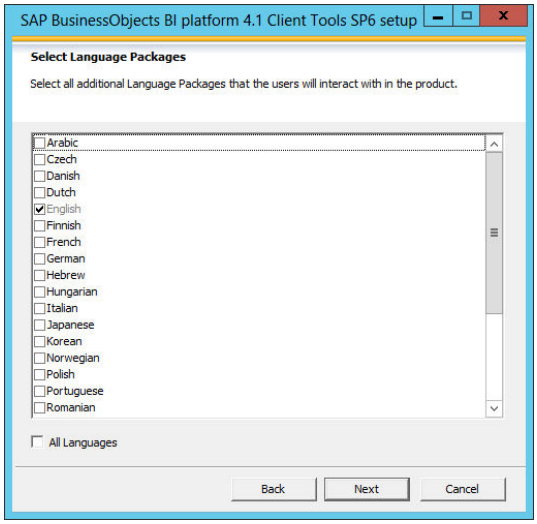

Figure 6.45 – Select Language Packages

4. Select **English** and click **Next**.

   The Select Features window appears. See Figure 6.46.

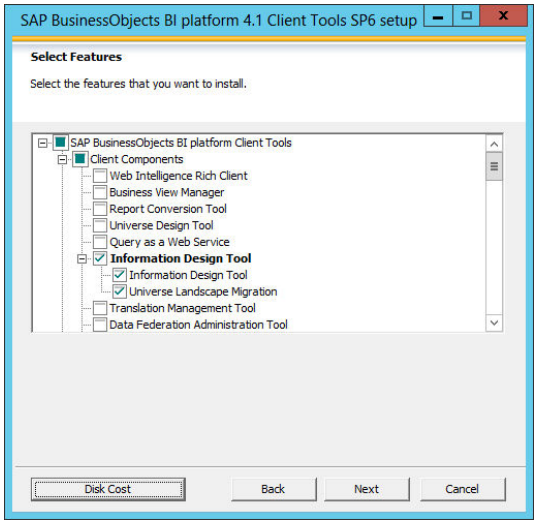

Figure 6.46 – Select Features Window

5. Select all the following features:
   - Information Design Tool
     - Information Design Tool
     - Universe Landscape Migration
   - Database Access and Security
     - Generic ODBC
     - Generic JDBC
     - Sybase
6. Click **Next**.
   - The features begin to install.
   - The Start Installation window appears.

     The SAP BusinessObject BI Start Installation window appears. See Figure 6.47.

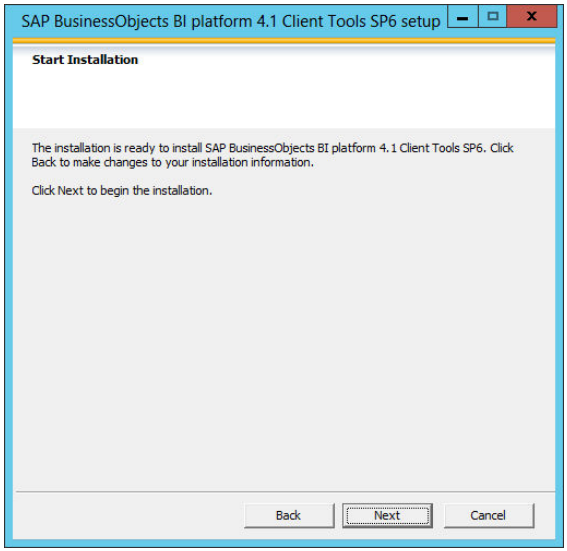

Figure 6.47 – SAP Start Installation Window

7. Click **Next**.

   The SAP BI Platform window appears while initializing. See Figure 6.48.

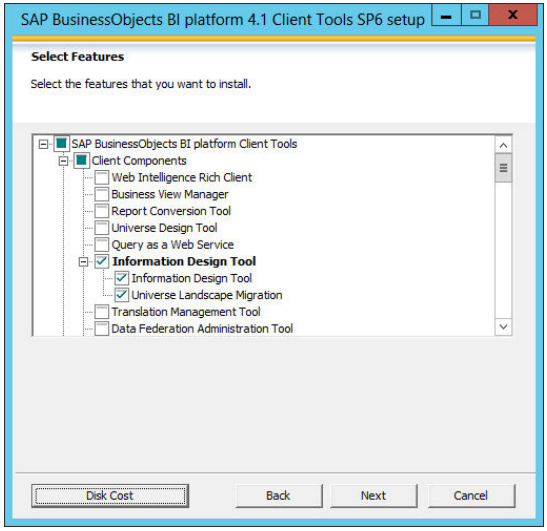

Figure 6.48 – SAP Initialize Setup Engine Window

After initialization, the following window appears.

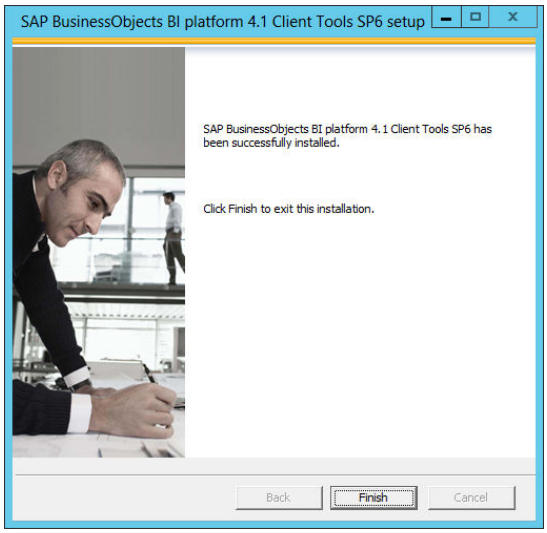

Figure 6.49 – SAP Successful Installation Window

8. Click **Finish**.

   The N_SIGHT and N_SIGHT PLUS - InstallShield Wizard appears.

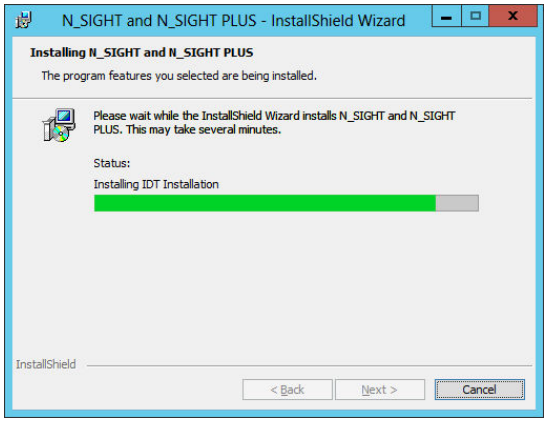

Figure 6.50 – Installing N_SIGHT and N_SIGHT PLUS

Multiple screens, including DOS windows, appear and disappear during this time. When the installation is complete, the following window appears. See Figure 6.51

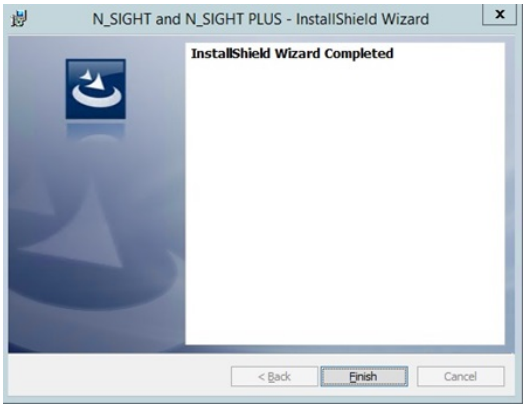

Figure 6.51 – InstallShield Wizard Completed Window

9. Click **Finish**.

   The following prompt appears to restart your computer.

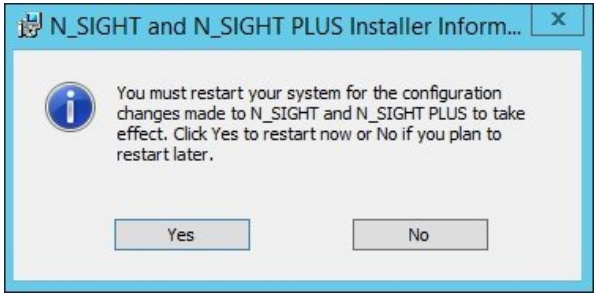

Figure 6.52 – Restart Prompt

10. Click one of the following:
    - **Yes**, to restart your computer.
    - **No**, if you plan to restart your computer later.

After the server has restarted, continue to "Setting Up N_SIGHT PLUS" in the *N_SIGHT Software Suite Getting Started Guide*.

Changing the SIA to use SQLA Instead of SSE

Complete the following steps to change the SIA to use SQLA instead of SSE.

1. From your computer's **Start** menu, right-click **Central Configuration Manager** (CCM) and select **Run as administrator**.

> If the Central Configuration is not available, BOE did not install correctly.

The following window appears.

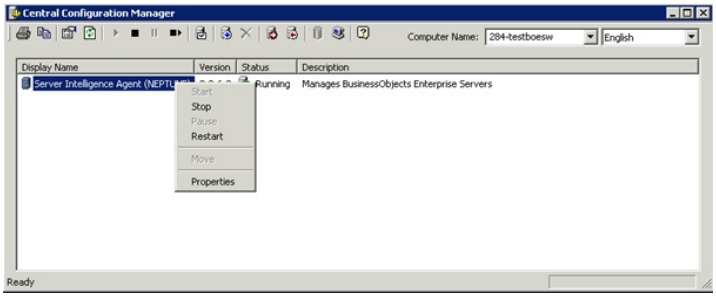

Figure 6.53 – CCF - Stop SIA

2. Right-click **Server Intelligence Agent (NEPTUNE)**.
3. Click **Stop**.
4. Double-click **Server Intelligence Agent (NEPTUNE)**.

   The following window appears. See Figure 6.54 on page 6-38.

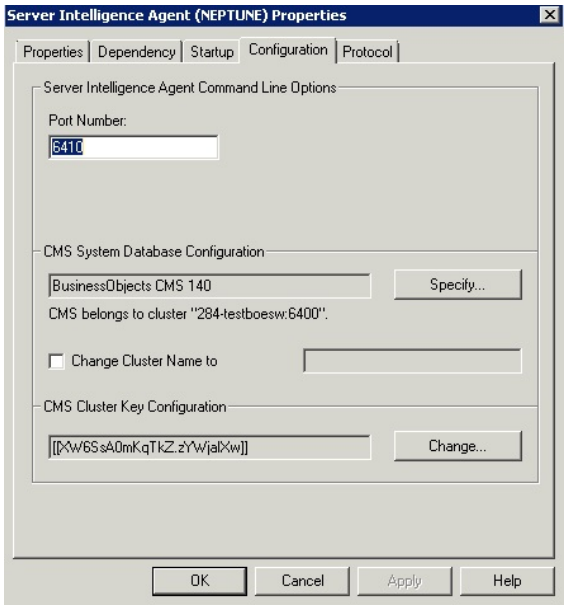

Figure 6.54 – SIA - Configuration Tab

5. Click **Configuration**.

Setting up the Database

Complete the following steps to set up the database.

1. On the Configuration tab under **CMS System Database Configuration**, click **Specify**.

   The CMS Database Setup window appears. See Figure 6.55 on page 6-39.

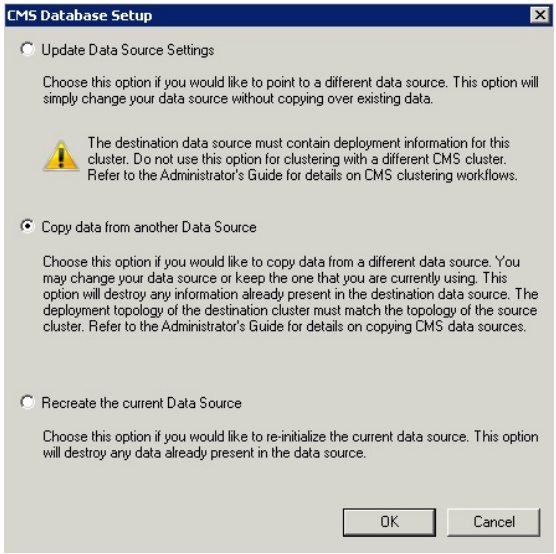

Figure 6.55 – CMS Database Setup

2. Select **Copy data from another Data Source** and click **OK**.

   The Specify Data Source window appears.

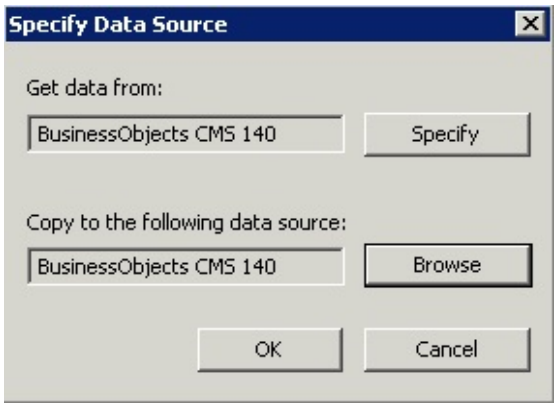

Figure 6.56 – Specify Data Source

3. Click **Specify** for **Get data from**.

   The Select Database Driver window appears.

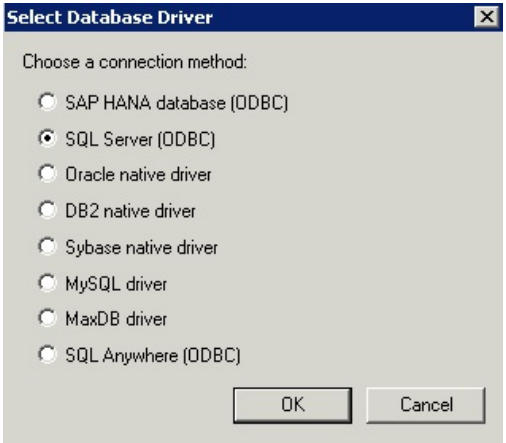

Figure 6.57 – Select Database Driver

4. Select **SQL Server (ODBC)** and click **OK**.

   The Select Data Source window appears.

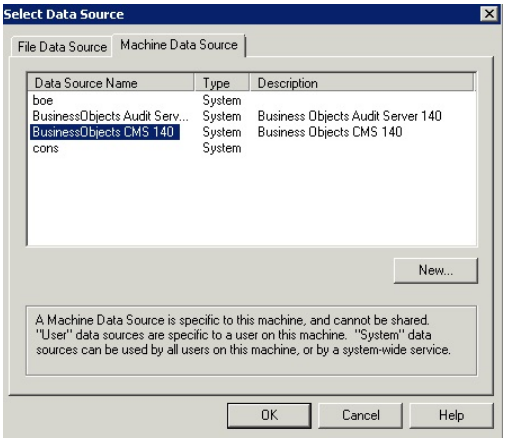

Figure 6.58 – Select Data Source - Machine Data Source Tab

5. Click the **Machine Data Source** tab.
6. Select **BusinessObjects CMS 140**.
7. Click **OK**.

   The SQL Server Login window appears.

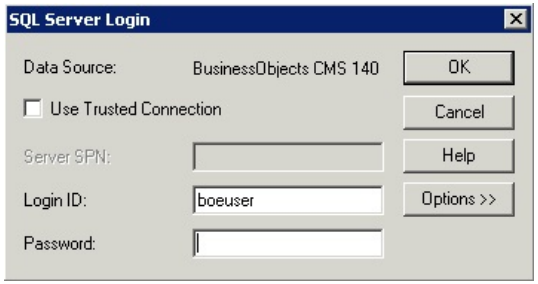

Figure 6.59 – SQL Server Login

Logging on to the SQL Server

Complete the following steps to log into the SQL server.

1. In **Password**, type the password.

   Contact Neptune Customer Support for the password.

2. Click **OK**.

   The Specify Cluster Key window appears.

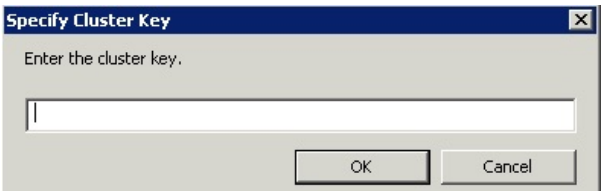

Figure 6.60 – Specify Cluster Key

3. Type the cluster key (provided by Neptune Customer Support) in the space provided.
4. Click **OK**.

   The Specify Data Source window appears as illustrated in Figure 6.56 on page 6-39.
5. Select **Browse** or **Copy to the following data source**.
6. Click **OK** and the Select Database Driver window appears as illustrated in Figure 6.57 on page 6-40.
7. Select **SQL Anywhere (ODBC)**.
8. Click **OK**.

Selecting the Data Source

Complete the following steps to select the data source.

1. On the Select Data Source window, select **boe**. See Figure 6.58 on page 6-40.
2. Click **OK**. The Connect to SQL Anywhere window appears.

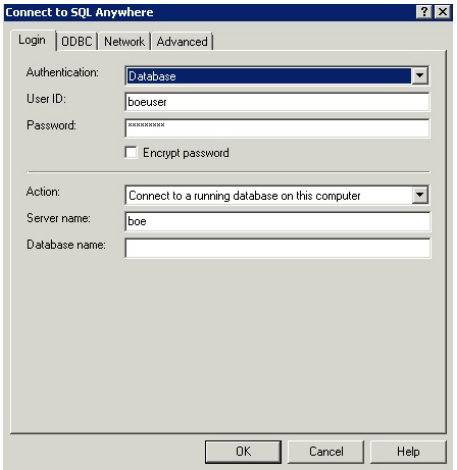

Figure 6.61 – Connect to SQL Anywhere

3. In the **Action** field, type **Connect to a running database on this computer.**
4. Click **OK**.

   The Specify Data Source window appears as illustrated in Figure 6.56 on page 6-39.

5. Click **OK**.

   The Specify Cluster Key window appears as illustrated in Figure 6.60 on page 6-41.

6. Type the cluster key (provided by Neptune Customer Support) for **Enter the cluster key**.
7. Click **OK**.

Configuring the Database

Complete the following steps.

1. After specifying the cluster key, click **OK**.

   The Central Configuration Manager dialog appears.

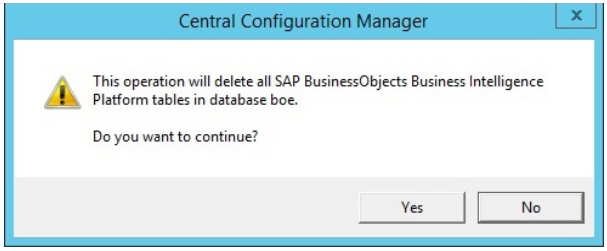

Figure 6.62 – Central Configuration Manager - Warning

2. Click **Yes**.

   The Migrating database progress bar appears. See Figure 6.63.

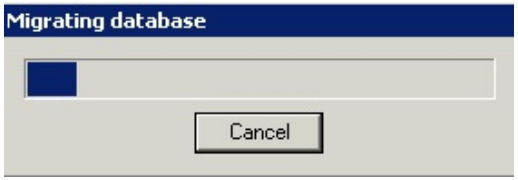

Figure 6.63 – Migrating Database

When migration is complete, the following message appears.

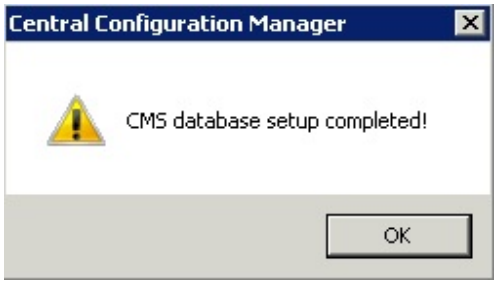

Figure 6.64 – CMS Database Setup Completed

3. Go to the Central Configuration Manager. See Figure 6.53 on page 6-37.
4. Right-click **Server Intelligence Agent (NEPTUNE)**.
5. Click **Stop**.
6. Double-click **Server Intelligence Agent (NEPTUNE)**.

7. If not already stopped, select stop and disable the following services. See Figure 6.65 and Figure 6.66.
   - SQL Server (BOE 140)
   - SQL Server Agent (BOE 140)
   - SQL Server Browser
   - SQL Server VSS Writer.

SPP Notification Service	Provides S...		Manual	Local Service
SQL Active Directory Helper ...	Enables int...		Disabled	Network S...
SQL Server (BOE140)	Provides st...	Started	Automatic	Local System
SQL Server Agent (BOE140)	Executes j...		Disabled	Network S...
SQL Server Browser	Provides S...	Started	Automatic	Local Service
SQL Server VSS Writer	Provides th...	Started	Automatic	Local System

Figure 6.65 – SQL Server (BOE 140)

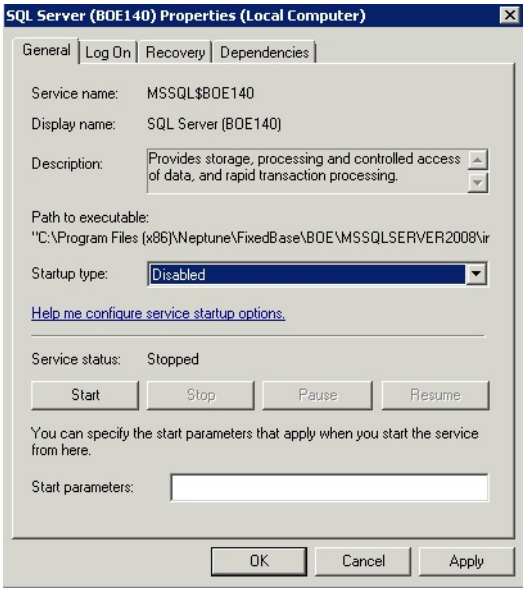

Figure 6.66 – SQL Server Properties

Turning Off BOE Auditing

To turn off auditing, complete the following steps.

1. Open an Internet browser window and navigate to the address: http://localhost/BOE/CMC.

Keep in mind the following:

- This URL is case-sensitive.
- If BOE does not install correctly, contact Customer Support for instructions on how to fix.

The SAP BusinessObjects log on window appears.

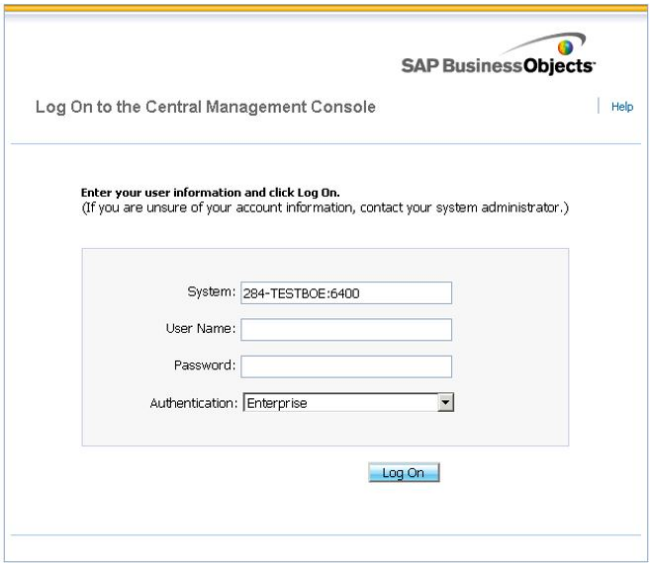

Figure 6.67 – Central Management Console Log On

2. In **User Name**, type **Administrator**.
3. In **Password**, type the password.

> Contact Neptune Customer Support for the password.

4. Click **Log On**.

   The home view for the Central Management Console window appears.

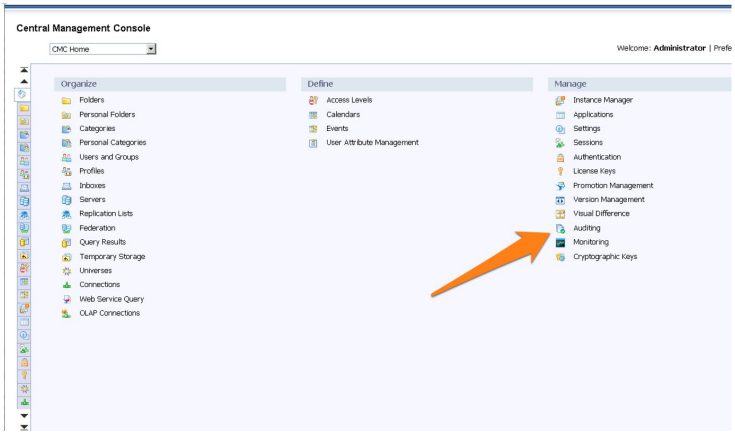

Figure 6.68 – Central Management Console

5. Select **Auditing**.

   The auditing view of the Central Management Console window appears. See Figure 6.69 on page 6-48.

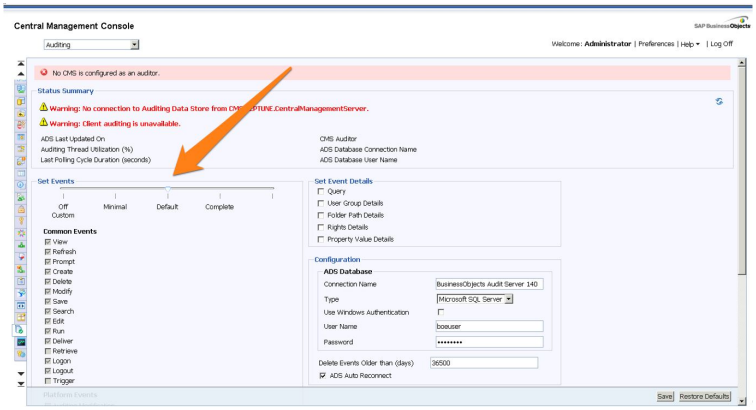

Figure 6.69 – CMC - Turn off Auditing

6. Go to **Set Events** and slide the bar to **Off**.
7. Click **Save**.

Completing Post-Installation Steps

To ensure that your host software works correctly, complete the post-installation steps explained in the following sections.

- "Installing the Reporting Module" on page 6-25
- "Changing the SIA to use SQLA Instead of SSE" on page 6-37
- "Setting up the Database" on page 6-38
- "Logging on to the SQL Server" on page 6-41
- "Selecting the Data Source" on page 6-42
- "Configuring the Database" on page 6-43
- "Turning Off BOE Auditing" on page 6-46

Installing N_SIGHT and N_SIGHT PLUS Host Software

This section provides instruction for installing the combined N_SIGHT and N_SIGHT PLUS host software.

Prerequisites

- Make sure the server is baseline.
- Apply the latest Windows updates to the server.
- Reboot the server prior to attempting to install.
- Place the installation file in the C:\Users\s<username>\Desktop directory.
- Be sure the installation folder contains the version you are installing.
- Locate the setup.exe file in the C:\Users\<username>\Desktop\<version number> directory.

  Example: C:\Users\sqa\Desktop\5.5.160129.

N_SIGHT and N_SIGHT PLUS Host Server Installation

Complete the following instructions for installing the N_SIGHT PLUS host software.

1. Complete all the steps for "Beginning the Installation" on page 6-2.
2. On the Custom Setup window ("N_SIGHT Software Suite Custom Setup" on page 6-6), select **N_SIGHT and N_SIGHT PLUS Host Install**.
3. Click **Next**.

   The Change Current Destination Folder for Your DATABASE window appears. See Figure 6.70 on page 6-50.

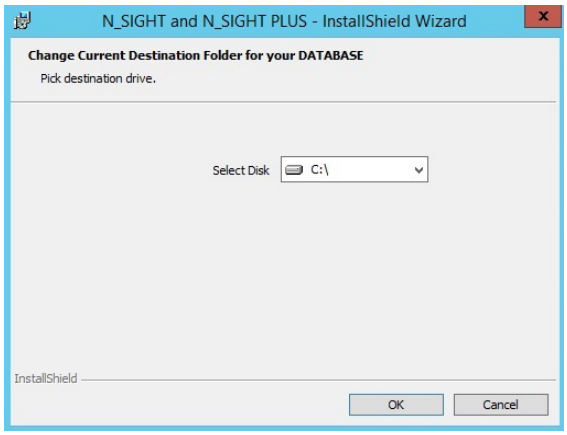

Figure 6.70 – Destination Folder for N_SIGHT Database

4. Select the drive where the database can reside.
5. Click **OK**.

   The Change Current Destination Folder for Your Major PROGRAMS window appears. See Figure 6.71.

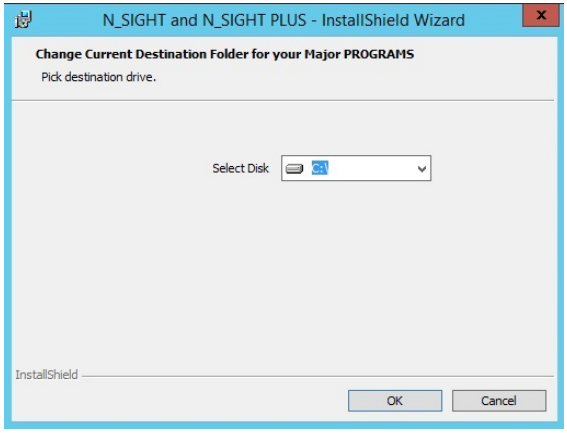

Figure 6.71 – Destination Folder for Major PROGRAMS

6. Select the drive where the host software contains the directory folder information where Basic Client, Combined Database, Advanced Server, and SAP BI reside.

Installing the Software

Complete the following steps to continue with the installation.

1. Click **OK** and the following window appears.

   The path location for the N_SIGHT host server programs appears. See Figure 6.72.

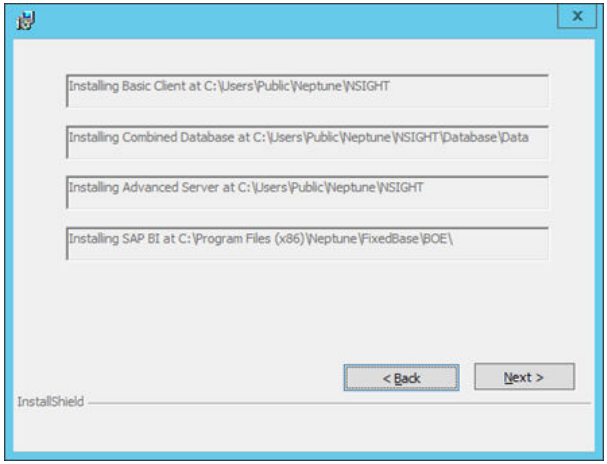

Figure 6.72 – N_SIGHT Path Where Programs are Installed

2. Click **Next** to continue.

   The Ready to Install the Program window appears. See Figure 6.73 on page 6-52.

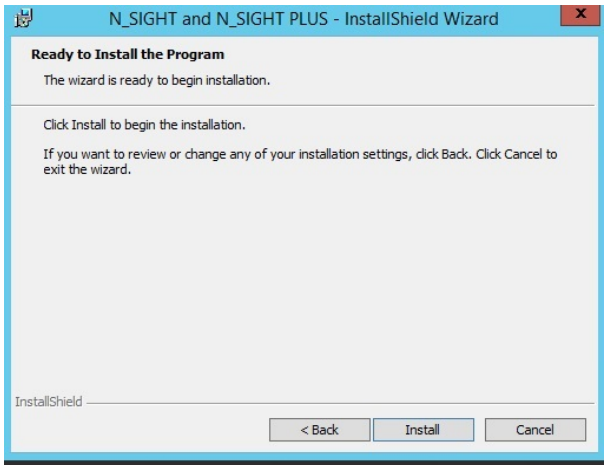

Figure 6.73 – N_SIGHT Client Ready to Install

3. Click **Install**.

   The Installing N_SIGHT and N_SIGHT PLUS window appears.

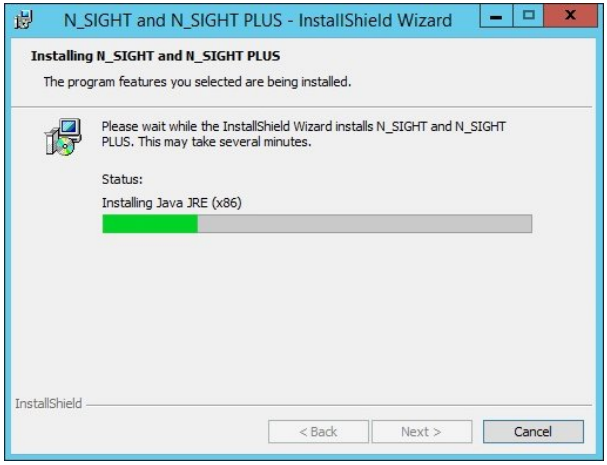

Figure 6.74 – Installing Java JRE (x86)

DOS Windows appear and disappear.

A progress bar indicates the various components and their status of installation.

The install performs a prerequisite check. The following window appears. See Figure 6.75.

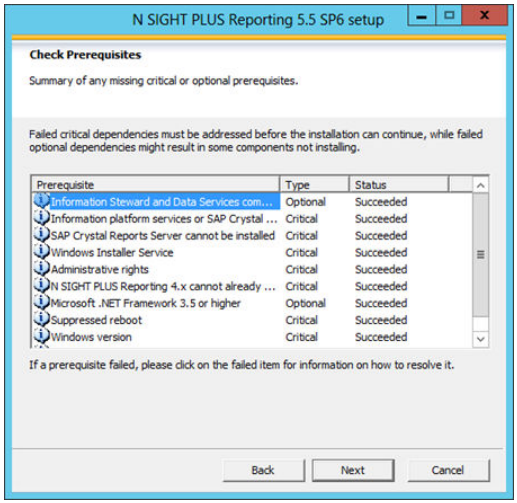

Figure 6.75 – N_SIGHT PLUS Prerequisite Check

4. Click **Next**.

   The Start Installation window appears. See Figure 6.76 on page 6-54.

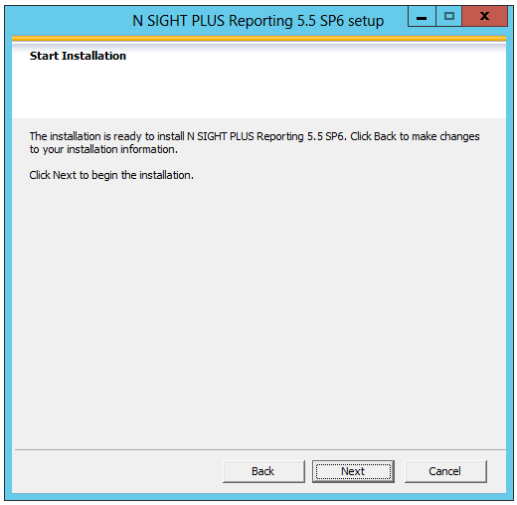

Figure 6.76 – Start Installation

If an item fails, select it to view information on how to resolve the failed check.

5. Complete the steps for "Installing the Reporting Module" on page 6-25.
6. When the reporting module completes installation, click **Finish** to exit the reporting installation.

   The installation continues. You can see a DOS window running while the status bar on the InstallShield wizard continues.

   When the N_SIGHT and N_SIGHT PLUS installation is complete, the Installation Completed window appears. See Figure 6.77 on page 6-55.

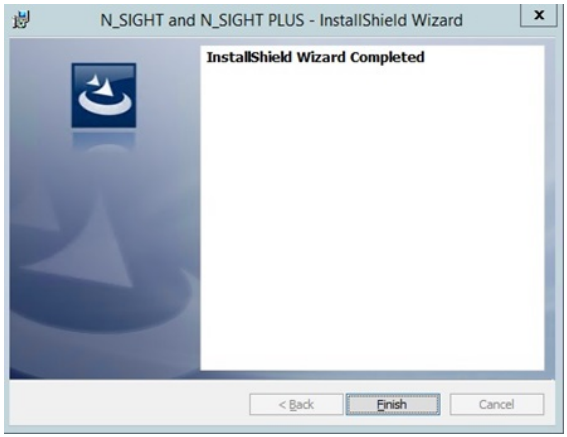

Figure 6.77 – Installation Completed

7. Click **Finish**.

   The following prompt appears to restart your computer. See Figure 6.78.

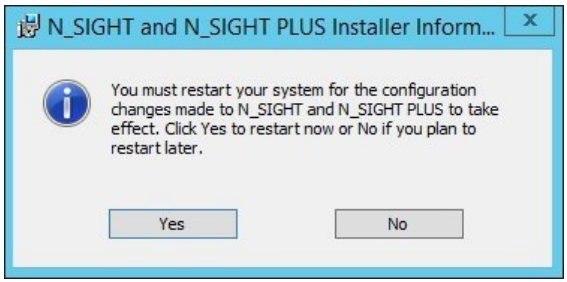

Figure 6.78 – Restart Prompt

8. Click one of the following:
   - **Yes**, to restart your computer.
   - **No**, if you plan to restart your computer later.

Completing Post_Installation Steps

Prerequisites

Be sure to:

- Verify that the host application is installed
- Reboot the server
- Open the Web browser on the server
- Have the site ID for host application

Complete the following steps.

1. In your browser, go to the following URL.

   http://localhost/BOE/CMC

   The SAP BusinessObjects Central Management Console log on window appears. See .

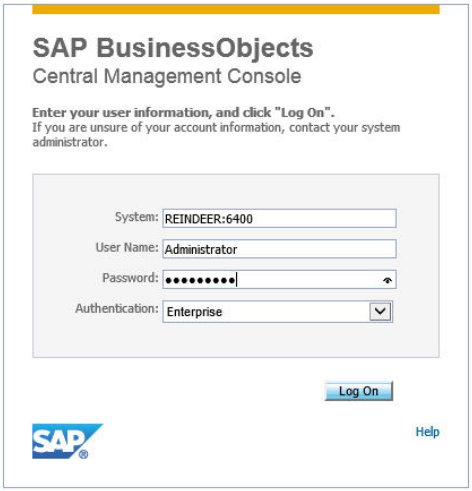

Figure 6.79 – SAP BusinessObjects CMC Log On

2. Verify **System** has the correct **<server name>:6400**.
3. Type **Administrator** in **User Name**.
4. Type your password (that you received from Customer Support) in **Password**.
5. Verify **Authentication** contains **Enterprise**.
6. Click **Log On**.

   The System Configuration Wizard window appears.

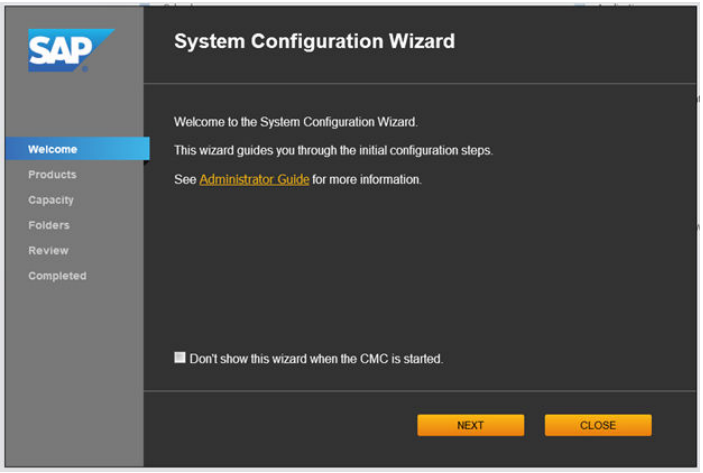

Figure 6.80 – SAP System Configuration Wizard

Completing the SAP System Configuration Wizard

Complete the following steps.

1. On the SAP System Configuration Wizard, click **Close**.
2. The Central Management Console screen appears. See Figure 6.81 on page 6-58.

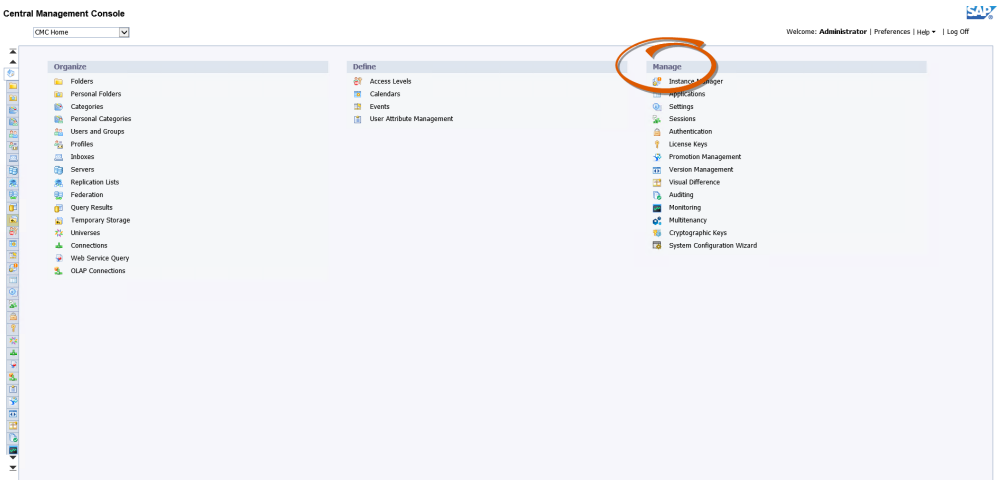

Figure 6.81 – SAP Central Management Console

3. Under the Manage section, click **Auditing**. See Figure 6.81 and Figure 6.82.

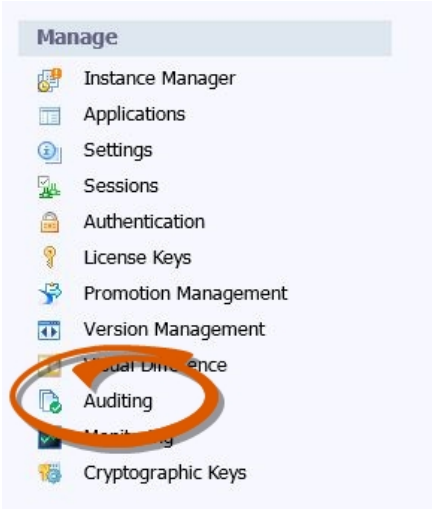

Figure 6.82 – SAP Central Management Console - Manage

The Set Events section appears.

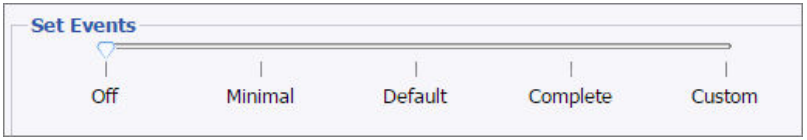

Figure 6.83 – SAP Central Management Console - Set Events

4. Under **Set Events**, click **Off**.
5. Click **Save**.
6. Log off of BOE/CMC console.

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Appendix A: N_SIGHT Meter Reading / Override

This chapter provides information about meter reading and override.

Neptune Meter Dials

Meter odometers appear similar to these examples. All meters contain six-indexing wheels, and the shaded dials are fixed zeros printed on the meter dial face. The E-CODER® register displays a nine-dial output and transmits eight.

Number of Dials

In N_SIGHT, the host software adjusts the reading to the value of the Dials field in the import file whether or not the Adjust Dials option is enabled. The unadjusted reading is also exported to a different field.

N_SIGHT captures eight-digit readings (reflecting the higher resolution of the E-CODER). Readings from ARB V and ProRead encoders are padded with trailing zeros to fill the eight digits.

Example:

A two-board ARB V register reading of 1234 becomes 12340000 in the N_SIGHT host software. There are settings in N_SIGHT that allow the number of dials displayed to be eight or less.

Typical Meter Dials

The cubic foot measurement dial is used in the following examples.

Table A.1 – Meter Reading Display

Readings as They Appear For	Small Meters 5/8" - 1" 1 Cu Ft Dial	Intermediate Meters 1½" - 4" 10 Cu Ft Dial	Large Meters 6" and Up 100 Cu Ft Dial
Typical Meter Dials	1 2 3 4 5 6	1 2 3 4 5 6 0	1 2 3 4 5 6 0 0
Actual Cumulative Meter Reading	123,456 cu. ft.	1,234,560 cu. ft.	12,345,600 cu. ft.
Four-digit Meter Reading	1234	1234	1234
Six-digit[1] Meter Reading	123455	123455	123455

[1] The sixth digit in a six-digit meter reading is rounded down to five or zero.

Meter Readings

As shown in Table A.1, typical four-digit remote meter readings include only the four left-most indexing digits on the meter odometer. They appear in the handheld as an uninterrupted string of numbers

Example: 1234, 9876, 0617, etc.

If the reading includes a digit error, the error is displayed.

Example: 123–

Typical six-digit meter readings include all of the indexing digits on the meter odometer and also appear as an uninterrupted string of numbers.

Example: 123455, 987650, 051705, etc.

If the reading includes a digit error, the error is displayed.

Example: 987–0, 051H05, etc.

In all remote meter readings:

- Non-encoded digits, including fixed zeros, are not included in the meter reading.
- The sixth digit in a six-digit ARB reading is displayed as a five or zero.

The CIS utility billing system vendor must compensate for the number of billing units based on utility-specific requirements. This procedure is normally handled by the billing software by using a multiplier or type code for each meter type to calculate the billing amount. In a mixed meter environment, the CIS utility billing system vendor should track meter size, type, manufacturer, and multiplier for each account.

Example:

Assume all customers are billed by 100-cubic-feet increments. All meters are four-digit remotes. Using the same figures as in Table A.1, refer to Table A.2 on the next page for the required multipliers.

Table A.2 – Meter Reading Display - Four Digit Remotes

Elements Needed to Determine Billed Reading	Small Meters 5/8" - 1" 1 Cu Ft Dial	Intermediate Meters 1½" - 4" 10 Cu Ft Dial	Large Meters 6" and Up 100 Cu Ft Dial
Typical Meter Dials	1 2 3 **4*** 5 6	1 2 3 4 **5*** 6	1 2 3 4 5 **6*** 0 0
Four-digit Meter Reading	1234	1234	1234
Actual Cumulative Meter Reading	123,456 cu ft	1,234,560 cu ft	12,345,600 cu ft
Required Billing Units	1234	12345	123456
Billing System Multiplier and Billed Meter Reading	1234 x 1 = 1234	1234 x 10 = 12340	1234 x 100 = 123400

* Required billing units = 100 cu. ft. increments

ProRead (ARB VI) Registers

The Neptune ProRead register contains a programmable odometer. The odometers in the previous examples are hard-wired to present either a four-digit or six-digit meter reading. The odometer in the ProRead registers is also available with those options, but the meter can be programmed to return up to the maximum number of digits that are hard-wired in the odometers. Programming always begins at the leftmost odometer digit.

Example: | 1 | 2 | 3 | 4 | 5 | 6 |

A four-digit hard-wired version can be programmed to read either:

- Four digits = 1234
- Three digits = 123

The four-digit hard-wired version cannot be programmed to return five digits or six digits. If this accidentally occurs, the read would appear as an error.

Example: 1234-0 | 1 | 2 | 3 | 4 | 5 | 6 | 0 | 0 |

Likewise, a six-digit hard-wired version can be programmed to read:

- Six digits = 123455
- Five digits = 12345
- Four digits = 1234
- Three digits = 123

Applying and programming these types of registers correctly for the appropriate meter size can greatly enhance billing accuracy. Instead of the previous meter reading examples in which multipliers of 10 are used to create zero billing digits at the end of the actual read digits, these meters can provide greater resolution. This results in an increase in billing accuracy.

With the given scenario on the previous page (100-cubic foot increments), we would recommend using four digit, hard-wired meters for all small meters (since only four digits are required to obtain the appropriate billing unit accuracy). We would also recommend using six digit, hard-wired meters on all intermediate and large meters. The intermediate meters can be programmed to return five digits, and the large meters can be programmed to return all six digits.

E-CODER (ARB VII) Electronic Digital Register

The E-CODER is an electronic digital encoder register that has a proprietary integrated circuit that provides absolute registration with no internal battery requirement. The E-CODER functions in two modes: E-CoderBASIC and E-CoderPLUS. The E-CoderBASIC mode functionality is the same as ProRead featuring a programmable ID number (up to 10 digits), three user characters, and three-digit to six-digit meter reading.

When connected to Neptune's R900 v2 radio MIU, the E-CODER operates in E-CoderPLUS mode providing a high-resolution, eight-digit meter reading and value-added features including leak, tamper, and backflow detection.

Example: Nine-digit LCD displays the meter reading in billing units of gallons or cubic feet.

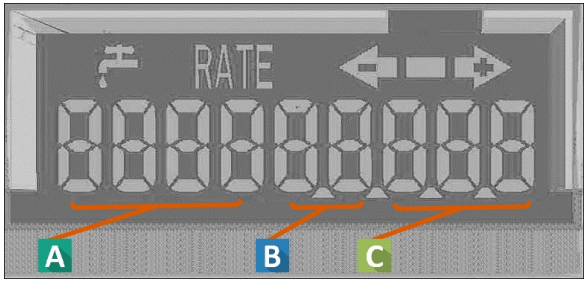

Figure A.1 – Nine-Digit LCD Display

A	**First four** digits	Typical billing digits.
B	**Fifth** and **Sixth** reading digits	Reading units.
C	**Last three** digits	Testing units used for meter testing.

The following sections describe the two modes in which the E-CODER functions.

E-CoderBASIC Mode

E-CoderBASIC Mode applies when an E-CODER is connected to a TouchPad.

The E-CODER functionality is the same as a standard ProRead encoder; that is, the odometer can be programmed with a field programmer to yield the following:

- Six-digit meter reading
- Five-digit meter reading
- Four-digit meter reading
- Three-digit meter reading

A specific ID number and user characters can also be programmed into the unit just like the standard ProRead encoder.

Example 1

E-CODER Odometer-Cubic Foot dial for residential meters, 5/8” through 1”

1	2	3	4	5	6	.	7	8	9

- Digit position six = one cubic foot position.
- This reading = 123,456 cubic feet (123,456.789 cubic feet).

If programmed as a six-digit meter reading, the interrogator and handheld device displays the following.

1	2	3	4	5	6

After the handheld device is unloaded, the N_SIGHT host software database* displays the following.

1	2	3	4	5	6

* Dependent upon # of dials, justification and zero-fill setting in the N_SIGHT software setup. In the example above, # dials = 6.

Example 2

E-CODER (ARB VII) Odometer-Gallon dial for residential meters, 5/8” through 1”.

1	2	3	4	5	6	7	.	8	9

- Digit position six = 10-gallon position;
- Digit position seven = one-gallon position.
- This reading = 1,234,567 gallons (1,234,567.89 gallons).

If programmed as a six-digit meter reading, the handheld displays the following.

1	2	3	4	5	6

The N_SIGHT software database*(see note above) displays the following.

1	2	3	4	5	6

E-CoderPLUS Mode

The E-CoderPLUS Mode applies when an E-CODER is connected to an R900 v2.

Example 1

E-CODER Odometer-Cubic Foot dial for residential meters, 5/8” through 1”.

1	2	3	4	5	6	.	7	8	9

- Digit position six = one-cubic foot position.
- This reading = 123,456 cubic feet (123,456.789 cubic feet)

The handheld device receiving the RF transmission displays the following.

1	2	3	4	5	6	7	8

The read displayed appears like this example in either RF Test Mode or in Route Mode.

The N_SIGHT software database* displays the following.

1	2	3	4	5	6

* Dependent upon # of dials, justification and zero-fill setting in the N_SIGHT software setup. In the example above, # dials = 6.

Example 2

E-CODER Odometer-Gallon dial for residential meters, 5/8" through 1".

1	2	3	4	5	6	7	.	8	9

- Digit position six = 10-gallon position.
- Digit position seven = one-gallon position.
- This reading = 1,234,567 gallons (1,234,567.89 gallons).

The handheld device receiving the RF transmission displays the following.

1	2	3	4	5	6	7	8

The read displayed appears like this example in either RF Test Mode or in Route Mode.

The N_SIGHT software database* displays the following.

1	2	3	4	5	6

* Dependent upon # of dials, justification and zero-fill setting in the N_SIGHT software setup. In the example above, # dials = 6.

Table A.3 – E-CODER Meter Reading Display (Cubic Feet / Gallons)

Readings as They Appear For	Small Meters 5/8" - 1"	Intermediate Meters 1½" - 4"	Large Meters 6" and Up
E-CODER (ARB VII) Dial			
Cubic Feet	123456.789	1234567.89	12345678.9
Gallon	1234567.89	12345678.9	123456789.

[1] The sixth digit in a six-digit meter reading is rounded down to five or zero.

Table A.4 – E-CODER Meter Reading Display (Cubic Meters)

Readings as They Appear For	Small Meters 5/8" - 1½"	Intermediate Meters 2" - 4"	Large Meters 6" and Up
E-CODER (ARB VII) Dial			
Cubic Meters	12345.6789	123456.789	1234567.89

Manual Meter Readings

Manually entered meter readings are not restricted to the same digit rules as the remote meter readings. For consistency, Neptune prefers that meter readers enter manual readings in the same format that automatic reads would appear for a given meter. This is especially important in a mixed manual or automatic metering system. However, manual reads entered are based on instructions given to the meter reader by the utility.

Example:

1	2	3	4	5	6	0	0

Using the meter shown here, a typical manual read can appear as:

- 123
- 1234
- 12345
- 123456
- 12345600

The preferred manual reading for billing in 100-cubic-feet increments would be 123456. Any unused digit positions in the meter reading defaults to spaces.

The meter reader is generally instructed to enter a specific quantity of digits to match the billing requirements. For example, if the CIS utility billing system vendor calculates bills based on 100-cubic-feet increments, the meter reader should enter all meter digits from left to right, down to the 100-cubic-feet position on the meter dial. For example:

- **1 cu ft meter** - Enter the four leftmost digits, including leading zeros.
- **10 cu ft meter** - Enter the five leftmost digits, including leading zeros.
- **100 cu ft meter** - Enter the six leftmost digits, including leading zeros.

In some cases, the utility can instruct the meter reader to enter the reading without leading zeros. This can work because the CIS utility billing system vendor can construct the correct consumption and produce a bill from these types of readings.

Right Justify and Zero Fill Meter Readings

The N_SIGHT host software has the ability to right justify or zero fill the readings that are unloaded from the handheld. The settings of this parameter are determined by the utilities and their billing requirements.

Examples:

- A typical four-digit reading: 1527
- Zero-filled enabled: 1527000000
- Right-justify enabled: 0000001527

If a meter reading contains an error, no right-justify or zero-fill adjustments are made. These readings are to be treated as rejects or rereads or estimated by the CIS utility billing system vendor.

Adjust the R900/R900v2/R900v3 Readings for EZRouteMAPS

This section is only for EZRouteMAPS users.

After you install and configure the N_SIGHT software, the first time you start N_SIGHT you are directed to enter the initial setup values for your system so that it is ready for use. Refer to Table 6 in the *N_SIGHT Software Suite Getting Started Guide* for a description of all the values.

Neptune strongly recommends that you do not change the locations for the directories created by the installation program.

Adjust R900 Readings is the option for an automatic adjustment of R900 readings. To enable this adjustment, check this box on the N_SIGHT Initial Setup Values Dialog.

This option reads only the first set of digits depending on the number of dials set in the Import file.

When this option is selected, the Adjust Dials option appears. This option allows you to set the number of dials. This option is only available if you check the box for Adjust R900 Readings.

Examples:

If the number of dials is set to four, then the returned reading is adjusted to read the first four digits. If the number of dials is set to a number higher than six, then the trailing zeros are dropped.

The number of dials in the Import file should be set to adjust to the actual number of digits of the register. If the number of dials is less than the actual reading digits, the readings have a shortened number of digits and are not accurate.

Enabling the R900 Adjustment

To enable the Adjust R900 Readings option, complete the following steps.

1. When you start N_SIGHT for the first time, the Enter Initial Setup Values dialog appears as pictured in Figure A.2 on page A-15, asking you for the initial setup values.

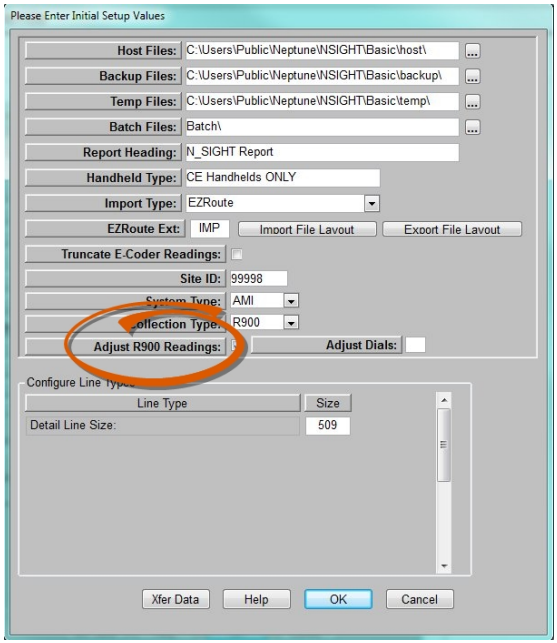

Figure A.2 – Initial Setup Values Dialog

2. Select **Adjust R900 Readings** to enable this option.

The Adjust R900 Readings option only appears when EZRoute is selected for Import Type. The option reads only the first set of digits depending on the number of dials set in the import file.

The Adjust Dials checkbox appears on the Initial Setup Value dialog as shown in Figure A.3.

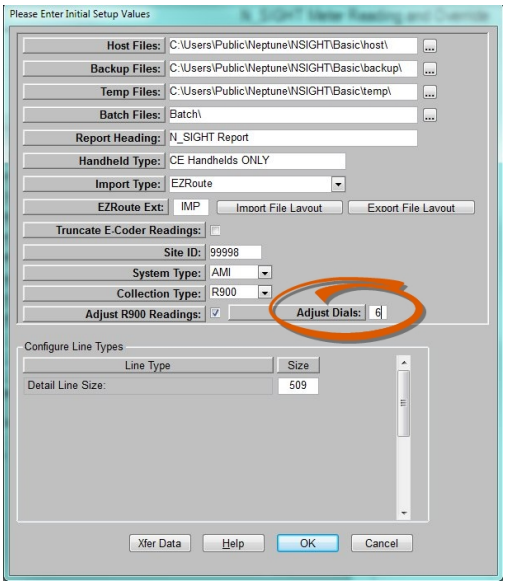

Figure A.3 – Adjust Dials Check Box

The Adjust Dials value is used as the default for all R900 records, if the number of dials is not set for accounts in the import file.

3. Select Adjust Dials, if applicable. (This field only displays when you select Adjust R900 Readings.) Refer to the example on page.

The Number of Dials in the Import file should be set to adjust to the actual number of digits of the reading. If the Number of Dials is less than the actual reading digits, the readings have a shortened number of digits and are not accurate.

Reading Override

High/Low Limit Tests

As meter readings are entered, a high/low meter reading limit test is performed on all accounts that contain data in the High Reading Limit and Low Reading Limit fields.

The characteristics of four fields affect high/low testing: the Meter Reading field, High Reading Limit, Low Reading Limit, and Number of Dials fields.

Meter Reading Field

Before continuing, review the definition of a meter reading field.

Meter Readings Review

The four-digit meters transmit the four most significant digits on the odometer to the handheld. If the meter odometer has a reading of:

1	2	3	4	5	6

the handheld receives 1234.

The six-digit meters transmit all six indexing digits on the odometer to the handheld. For example, if the meter odometer has a reading of:

1	2	3	4	5	6

the handheld receives 123455.*

*The last digit of a six-digit meter displays a five or a zero.

In addition, remember that the utility can program ProRead registers to transmit between three and six digits in a meter reading program.

Leading zeros in ARB readings are transmitted from the meter and are received by the handheld. If the **Read Direction** is **L** or **R**, the number of digits in the Hi/Lo fields must match the number of digits in the reading. If the **Read Direction** is **C**, then leading zeros in the accompanying **High Limit** and **Low Limit** fields can be omitted, but the **Number of Dials** field must contain the correct quantity of digits that are expected to be received by the handheld.

Manual Meter Review

For manually entered meter readings, the **Meter Reading** field can contain from one to 10 digits entered by the meter reader.

If the meter odometer reads 001234, the meter reader (depending on the value in the **Number of Dials** field and the utility instructions) can enter any of these valid reads:

- 001234 - 1
- 00123 - 12
- 0012 - 123
- 001 - 234

High and Low Limit Fields

The data placed in the **High Limit** and **Low Limit** reading fields can be either left-justified or right-justified. However, all unused leading or trailing characters in the field must be spaces.

Example

Using the same example from the Manual Meter Review section, if the low reading limit is equal to the previous reading, the value in the Low Limit field can be any of the following:

- **Number of Dials** = six>...**Low Limit** = 001234 or 1234
- **Number of Dials** = five...**Low Limit** = 00123 or 123
- **Number of Dials** = four...**Low Limit** = 0012 or 12

The data in the **High Limit** field would need to be equivalent quantities:

- **Number of Dials** = six...**High Limit** = 001350 or 1350
- **Number of Dials** = five...**High Limit** = 00135 or 135
- **Number of Dials** = four...**High Limit** = 0013 or 13

Table A.5 – Disabling the High/Low

High Limit Field	Low Limit Field	Test Results
Contains nines	Contains zeros	All readings pass the high/low test
Contains all spaces	Contains all spaces	Handheld does not attempt the test for that account
Contents equals **Low Limit** field	Contents equals **High Limit** field	All readings pass the high/low test

If the **Number of Dials** field contains incorrect data, the handheld attempts, but does not complete, the high/low test for that account. A warning is issued to the meter reader.

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Appendix B: N_SIGHT Record Types, Codes, and Configurations

The appendix includes the following information.

- N_SIGHT Record Types (see Table B.1)
- Types of N_SIGHT Read Codes (see Table B.2 on the next page)
- Meter Type, Read Type Configurations (see the following):
  - Table B.3 on page B-4
  - Table B.4 on page B-4
  - Table B.5 on page B-5

N_SIGHT Record Types

Table B.1 – N_SIGHT Record Types

Record Type	Description
COMHD	Company Header
RTEHD	Route Header: belongs to the company header it follows
PRMDT	Premise Detail: Belongs to the route header it follows
PRMNT	Premise Notes: Belongs to the premise detail it follows
MTRDT	Meter Detail: Belongs to the premise detail it follows

Table B.1 – N_SIGHT Record Types (continued)

Record Type	Description
ORDST	Order Status: Belongs to the meter it follows (Export file only)
RDGDT	Reading Detail: Belongs to the meter it follows
ERTDT	ERT Detail: Belongs to the reading it follows

Type of Read Codes

Table B.2 below is intended for the N_SIGHT file format only.

Table B.2 – Type of Read Codes

Value	Description
AH	Admin Hi Fail
AL	Admin Low Fail
AR	Admin Read
AU	Admin Inactive
AZ	Admin Zero Use
EF	External Failure; adds more for validation of radio and probe reads
ER	External Read (Probe Read)
KA	Keyed Alpha
KH	Keyed High
KI	Keyed Inactive

Table B.2 – Type of Read Codes (continued)

Value	Description
KL	Keyed Low
KN	Keyed Negative Usage
KR	Keyed Read
KV	Keyed Verified
KZ	Keyed Zero Consumption
RA	Radio Alpha Characters (:::::)
RH	Radio High Reading
RI	Radio Inactive
RL	Radio Low Reading
RN	Radio Negative Consumption
RR	Radio Read
RT	Radio Tamper
RV	Radio Verified
RZ	Radio Zero Consumption

Meter Type, Read Type Configurations

The following tables are examples of Meter Type, Read Type configurations.

Table B.3 – Single Read Type Examples

Read Type	Meter Type	Indicates
WATR	0001	Advantage
WATR	0002	R900
WATR	0003	ERT
WATR	0004	Keyed

Table B.4 – Multiple Read Types Examples

Read Type	Meter Type	Indicates
WATR	0001	Advantage
WATR	0002	R900
WATR	0003	ERT
WATR	0004	Keyed
KWHR	0009	Keyed
DEMA	0010	Keyed

Table B.5 – Compound Meters

Read Type	Meter Type	Indicates
WATH	0011	Keyed
WATL	0011	Keyed

Meter Types cannot be shared with multiple Read Types unless involving the high and low sides of a compound meter.

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Appendix C: N_SIGHT PLUS Required Forms

This appendix provides the forms necessary for N_SIGHT PLUS.

- "Sample Fixed Network Questionnaire" on the next page
- "Propagation Analysis Request Form" on page 10

Fixed Network Questionnaire

The Fixed Network Questionnaire is required prior to order and implementation of an AMI System. See Figure C.1 on page C-2.

Fixed Network Questionnaire

Please respond to each question with as much detail as necessary in order to provide a complete picture of the project.

Territory Manager: Date:
Distributor Contact (name, title, phone number):
Current Neptune System Customer? Yes No Existing Neptune software version?
Who will do system N_SIGHT™ training?

Utility Information

1. Utility Name:
2. Utility Address:
3. Utility Key Contacts (name, title, phone number):
4. Utility Fixed Network Project Manager (name, title, phone number):

IT (Network, Server, Backhaul)

5. Utility IT Contacts for Project Duration (name, title, phone number):
6. Who is providing server? Meets Specs?
7. Backhaul Type (Cellular, Ethernet, Point2Point Radio):

Billing/CIS System

8. Billing Provider (name, company name, phone number):
9. Is an interface necessary to Billing? Yes No Is Transfer File already in Place? Yes No
10. Transfer File Writer (name, title, phone number)?

MIU

11. MIU Installer (name, company name, phone number):
12. What is meter/MIU installation schedule?
13. Meter units of measure?
14. Box lids style? Who is providing?
15. Total Services:
16. Number of Start/Pilot Services:
17. Duration of Pilot/Project:
18. Square miles to be covered:

Gateway/Collector

19. How many collectors?
20. Collector Installer (name, company name, phone number):
21. Electrical Contractor (name, company name, phone number):
22. Antenna Installer (name, company name, phone number):
23. Any solar sites?
24. Any permits required?
25. Traffic control required?
26. Any height/wind restrictions?
27. Airport/AM towers in area?

Additional Comments:

Figure C.1 – Sample Fixed Network Questionnaire

Propagation Analysis

The Propagation Analysis Request Form, electronic list of services, suggested antenna location details, and environmental factors are required to take a preliminary look at the utility account area to determine the extent of R450 System or R900 System coverage.

Figure C.2 on page C-4 provides an illustration of a Sample Propagation Analysis Request Form used by Neptune to conduct the propagation study.

NEPTUNE TECHNOLOGY GROUP

Fixed Network Propagation Analysis Request Form

Requestor: Request Date: mm/dd/yy
Distributor: NTG Account Manager:

Date Required: mm/dd/yy RFP Due/Presentation Date: mm/dd/yy
Purpose: ☐ RFP ☐ Presentation/Estimate/Decision ☐ Other:

☐ TURNKEY Collector Installation Quote Request (additional time required after study)

Utility/Account Name:
City: State:

☐ Services (addresses/coordinates) Attached
[preferred files: ESRI Shape file (SHP), EXCEL spreadsheet]

#Services (for study): Project Location (city/state):

Check all to include:

System Type: ☐ R450 ☐ Enhanced R900 ☐ R900v3 ☐ Other:
Reading Interval: ☑ Daily (default) ☐ Hourly ☐ Other:
Service Coverage Expectation: ☑ 99% / 90% (default) ☐ Other:

MIU/Endpoint Type:

☐ PIT with External Pit Lid Antenna (recommended)
☐ WALL External/Outside (recommended)
☐ INSIDE WALL (not recommended)
☐ INSIDE E-CODER)R900/ (not recommended and requires RM approval)
☐ GAS/R900G (R900G system only requires RM approval)
☐ OTHER:

☐ Asset (collector/antenna) Locations Attached
[preferred files: ESRI Shape file (SHP), EXCEL spreadsheet] - Include Coordinates, Address, City, State, Structure Type, Structure Height, Ground Elevation, Antenna Height, etc.

☐ Known RF Systems (SCADA, WiFi, etc.) on Structures (details included with asset information)

Height/Wind Restrictions for Structures ☐ Details:
Permitting Required ☐ Details:
Airport in Area (5miles/8km) ☐ Details:
AM Stations in Area (2miles/3km) ☐ Details:

Additional Comments:

ALL PROPAGATION REQUESTS SHOULD BE ROUTED THROUGH A NEPTUNE ACCOUNT MANAGER (TERRITORY, DISTRICT, OR AREA)

v20150601 propagationrequest@neptunetg.com 06/19/2015

Figure C.2 – Propagation Analysis Request Form

Appendix D: IT Requirements (Fixed Network)

Fixed network systems are very information technology (IT) dependent. As a result, it is critical to have your IT department involved at the earliest stages of the project.

N_SIGHT / N_SIGHT PLUS - Server

You can provide or purchase a dedicated server for the host software per specifications. Hosting through a cloud server is also an available option.

The host software requires a dedicated standalone server. Server specifications are based on the size of your customer base and are listed in Table 2.6 on page 2-14 and Table 2.9 on page 2-20.

It is also important to review the *N_SIGHT™ Software Suite Getting Starting Guide*.

Utility IT - Role and Responsibility

The following list includes the role and responsibility of the IT department at your utility.

- Install and setup a dedicated server for N_SIGHT / N_SIGHT PLUS software; including internal/external static IP addresses/DNS, NTP service.
- Set up the server with the local admin account required for support, upgrades, maintenance, etc.
- Configure the server network connections to email server, firewall, third-party applications, client workstations, etc.
- Open the R900 Gateway to server communication ports in the firewall. This can be done through an Ethernet connection (to a switch, router, media converter, or point-to-point radio communications) or via cellular communications (GPRS/CDMA) through the Internet. Static IP addresses can be used.
- Remote access (RDP or VPN) to SERVER for system support access.

A critical component of a successful system is ongoing support from Neptune's Customer Support Group.

- Solicit support for the CIS utility billing system vendor interface which often requires support from your IT and billing departments to verify or create billing transfer files. (Neptune v4 import file recommended.)
- Purchase cellular data plans using approved supported providers.
- Set up and support billing and mobile meter reading workstations for the N_SIGHT host software installation.
- Be sure to have an FTP server, which is required for R900 Gateway v1-v3 systems. Secure FTP is not supported.
- Provide usual services (UPS, anti-virus, server data backup (off-site), NTP) for the server, same as existing servers within utility network.

Server, Firewall, and Network

The following typical ports are required to open the firewall, servers, and routers. See Table D.1 on page D-3.

Table D.1 – Server, Firewall, and Network Ports

Port	Purpose
TCP 2638	Systems to access the server Sybase database
TCP 25	SMTP - Email server to server (unless changed)
TCP 8080	HTTP N_SIGHT & PLUS client / server connections
TCP 20/21	FTP support to server (upgrades, maintenance, etc.) and FTP location communication to R900 Gateway v1-v3 and server
UDP 123	NTP - R900 Gateway to access server or Public NTP
TCP 443	Web Services - R900 Gateway v4 communication with server
TCP 3389	RDP - Support access to server

Key Points

- The server must connect to the utility SMTP mail server in order to process system-generated emails and alarms. Default SMTP port TCP 25 is required.
- The server must have a static IP address (internal/public-external) and DNS for R450 DCs, R450 MCs, and R900 Gateways. Public-External IP/DNS is required for cellular; can also be needed for other third-party application connectivity.
- The R900 Gateways require NTP service. The server should be configured with NTP in Windows OS or other Utility NTP server; otherwise R900 Gateways need connection to public NTP servers. Using this NTP source requires UDP 123 to be open.
- The Support Group requires FTP ports 20 and 21 to transfer files to and from the server.

N_SIGHT PLUS Server

This section provides information on the N_SIGHT PLUS server.

Server Specifications

The server requires the following specifications. The N_SIGHT PLUS software requires a dedicated standalone server. Server specifications are shown in Table 2.9 on page 2-20 and are based on the size of the utility's customer base.

Neptune recommends using the services provided for other servers in network including:

- UPS
- Server data backup (off-site)
- Anti-virus
- The server must connect to the utility SMTP mail server in order to process system-generated emails and alarms. Default SMTP port TCP 25 is required.
- The server must have a static IP address for R450 DCs and R450 MCs to connect to the database.
- The server typically is located behind the utility firewall. A static public/external IP address is also needed when cellular backhaul is used. TCP 2440 must be opened on the firewall.
- The R450 DCs and R450 MCs require NTP service. The server should be configured with NTP in Windows OS or other utility NTP server; otherwise R450 DCs and R450 MCs need connection to public NTP servers. Using this NTP source requires UDP 123 to be open.
- The FTP ports 20 and 21 are required for the Neptune Technical Support Group to transfer files to/from the server. The following typical ports are required to be open on the firewall, servers, and routers.

Table D.2 – FTP Ports

Port	Purpose
TCP 2638	Systems to access server Sybase database
TCP 25	SMTP - Email server to server (unless changed)
TCP 8080	HTTP - Client and N_SIGHT push access to server
TCP 3389	RDP - Support access to server and Ethernet for R450 DCs and R450 MCs
TCP 20/21	FTP - Support access to server (for example: upgrades and maintenance)
UDP 123	NTP - R450 DCs and R450 MCs to access server or public NTP

R450 DC or R450 MC Backhauls

There are two different types of backhaul options available for the R450 DC and R450 MC: Ethernet and cellular. The network setup is slightly different for each type, depending on the method used.

Network (Ethernet) R450 DCs or R450 MCs

The R450 DCs and R450 MCs are installed inside the utility network and there are very few firewall considerations.

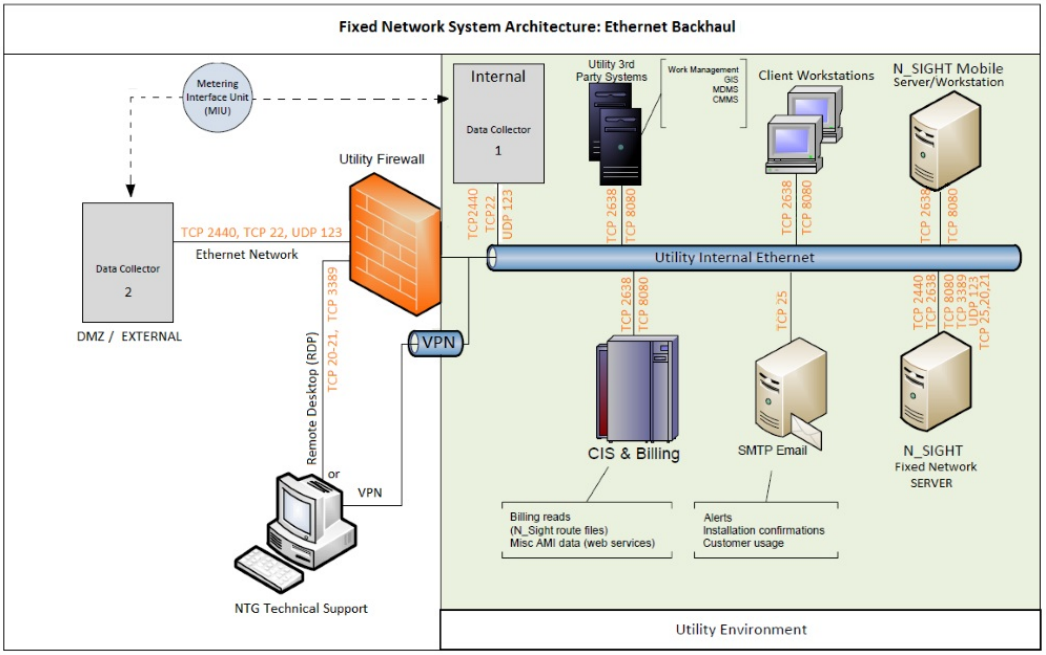

Figure D.1 – Fixed Network System Architecture - Ethernet Backhaul

The R450 DCs and R450 MCs require either dynamic or static IP addresses. Static IP addresses are more reliable and secure for firewall maintenance as ports can be opened for specific addresses rather than a range of addresses assigned by the IT network administrator. Regardless, a list of IP addresses or ranges must be made available prior to R450 DCs or R450 MCs configuration and activation.

An external IP address is required for the database. R450 DCs and R450 MCs can connect to the external address through a DMZ. The external address can use NAT (network address translation) to point to the internal address.

The following ports are required to be open on the firewall, servers, and routers.

Table D.3 – Ethernet - Required Ports

Port	Purpose
UDP 123	NTP - R450 DC and R450 MC to access server or public NTP
TCP 22	SSH - used for troubleshooting R450 DCs and R450 MCs by Technical Support
TCP 2440	MobiLink - R450 DC and R450 MC communication with server
TCP 2440	Collector database version 2.6-
TCP 2500	Collector database version 5.0+

Cellular (GPRS or CDMA) R450 DCs or R450 MCs

The R450 DCs and R450 MCs are installed outside the utility network and connect through the Internet to the database.

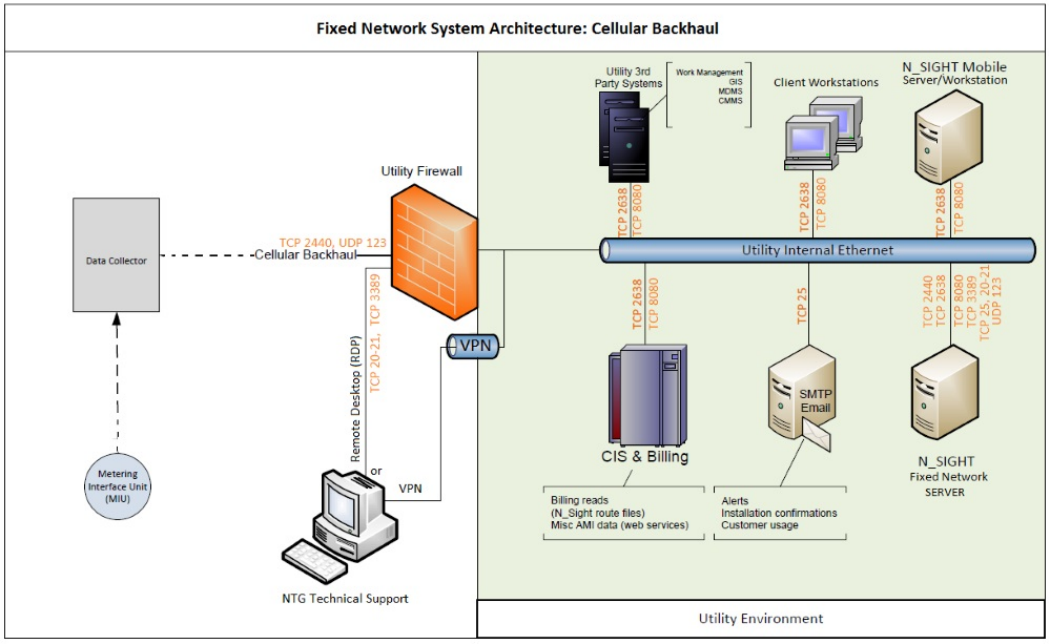

Figure D.2 – Fixed Network System Architecture - Cellular Backhaul

The modems in the R450 DCs and R450 MCs support GSM (GPRS) or CDMA networks.

The R450 DCs and R450 MCs require either dynamic or static IP addresses provided by the carrier. Static IP addresses are more reliable and secure for firewall maintenance as ports can be opened for specific addresses rather than a range of addresses assigned by the cellular network provider. Regardless, a list of static IP addresses must be made available prior to R450 DCs or R450 MCs configuration and activation.

A static public/external IP address is required for the server. R450 DCs and R450 MCs can connect to the public/external IP address through DMZ and firewall. The external address uses NAT (network address translation) to point to the internal address.

The following ports are required to be open on the firewall, servers, and routers.

Table D.4 – Cellular - Required Ports

Port	Purpose
UDP 123	NTP - R450 DC and R450 MC to access the server
TCP 2440	MobiLink - R450 DC and R450 MC communication with the server
TCP 2440	Collector database versions 2.6-
TCP 2500	Collector database versions 5.0+

Cellular data plans required for cellular modem provisioning are usually referred to as M2M plans. For new systems, it is recommended to start with a large (2-GB to 4-GB/collector, unlimited) data plan until usage can be assessed after several months. MIU, R450 DC, or R450 MC installations can create added usage at project start. It is possible to provide an estimate; however, the cellular account holder is responsible for any overage costs. Some carrier plans include pooling multiple cellular devices into one large bucket of data, so make sure the bucket equals number of collectors multiplied by 4-GB.

The carrier could require a SIM card and/or the IMEI, ESN, or MEID from cellular modem to add to account and provision. The IMEI, ESN, or MEID are provided to the project/utility stakeholders after R450 DCs and R450 MCs are shipped from the manufacturer, so the account setup and provisioning can be completed by carrier.

If static IP addresses are desired for implementation, they must be requested during setup and provisioning. GPRS with SIM cards have different APN for static IP versus dynamic IP. The carrier also provides a static IP address for each modem or SIM.

R900 Gateway Backhauls

R900 Gateway ports are the same for Ethernet or cellular. However, ports must be opened in external firewalls for cellular to connect with server. Internal firewalls can also be challenging for Ethernet when multiple networks are connected. It is important to verify all firewall ports are set between R900 Gateway and server.

R900 Gateway v4 Using Web Services

In addition to above server ports, the R900 Gateway v4 requires the following ports to be opened for the firewall, servers, and routers for connectivity. These ports are subject to change and additional ports could be needed in the future.

The following ports are required to be open on the firewall, servers, and routers.

Table D.5 – R900 Gateway Ports

Port	Purpose
UDP 123	NTP - R450 DC and R450 MC to access the server or public NTP
TCP 443	Web services - R900 Gateway communication with server

Cellular Data Plans

Cellular provider plans are required for cellular modem provisioning which usually refer to M2M plans. For new systems, it is recommended to start with a large (2-GB to 4-GB/R900 Gateway, or unlimited) data plan until usage can be assessed after several months. MIU and R900 Gateway installations can create added usage at project start.

It is possible to provide an estimate; however, the cellular account holder is responsible for any overage costs. Some carrier plans include pooling multiple cellular devices into one large bucket of data, so make sure bucket equals the number of R900 Gateway multiplied by 4-GB.

The carrier could require a SIM card and/or the IMEI, ESN, or MEID from cellular modem to add to account and provision. The IMEI, ESN, or MEID are provided to Project/Utility Stakeholders after R900 Gateways are shipped from manufacturer so account setup and provisioning can be completed by carrier.

If R900 Gateway static IP addresses are desired for implementation, they must be requested with the carrier during setup and provisioning. GPRS carriers with SIM cards often have a different APN for static IP vs. dynamic IP. The carrier can provide a list with static IP address details for each modem/SIM.

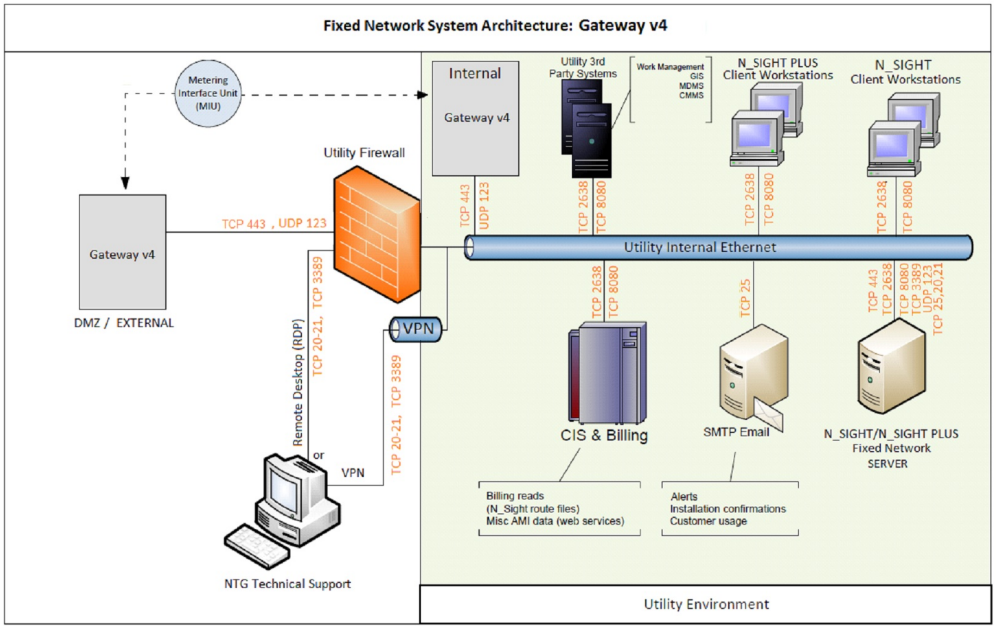

Figure D.3 – R900 Gateway v4 (Cellular/Ethernet)

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