GE Healthcare

Project Implementation Guide

CARESCAPE Gateway

Working together to get your new technology online so you can begin providing patient care.

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1.0 Introduction

1.1 About this manual

This guide is designed to provide necessary information regarding implementation of a CARESCAPE™ Gateway system and the development of an interface between the GE Healthcare Mission Critical (MC) Network and the Hospital Information System (HIS). TCP/IP and HL7® are the standard protocols used during interface development. To ensure a successful implementation, this guide provides information needed to prepare you for planning, installation, configuration, testing, and activation of your system. Your sales representative will guide you through this process. The contents of this manual and the detailed steps may not apply to every installation, as equipment, site needs, and customer requirements can differ from hospital to hospital.

Implementation of a CARESCAPE Gateway system is best accomplished through a team effort involving both the customer and GE. The activities outlined in this guide are designed to:

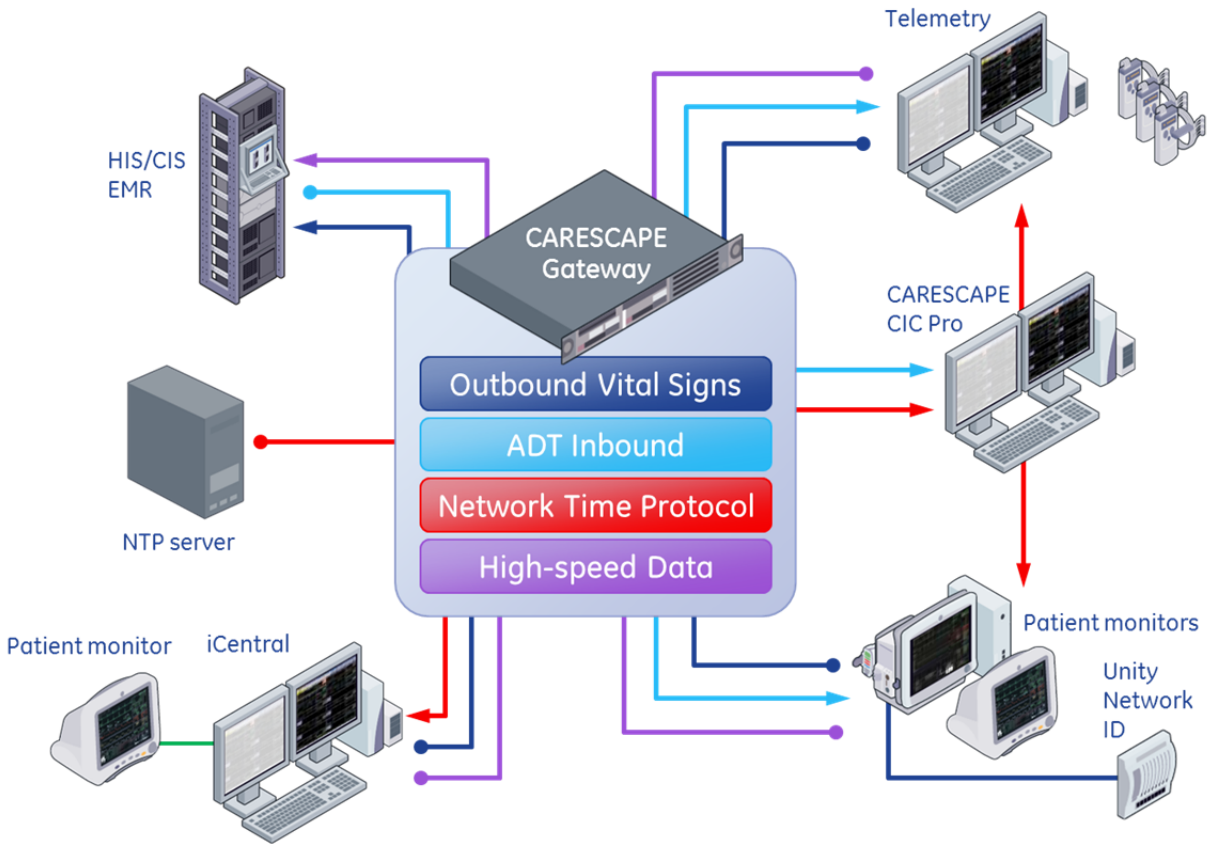
- Define the team members and their responsibilities
- Outline high-level project tasks
- Define what information is needed, who should supply it, and when it should be supplied
- Create and communicate the project schedule
- Transition the customer to successful operation of the CARESCAPE Gateway system

1.2 Intended audience

The Project Implementation Guide is an information resource for both GE and customer team members involved in any phase of implementation. This guide also can be useful to hospital administrators, managers, and staff who have an interest in the overall implementation process. Our intent is to keep this guide concise and, when possible, to reference other documents published by GE for product descriptions, specifications, and technical information.

1.3 Product specifications and overview

Please refer to product brochures and service manuals for detailed physical, electrical, and environmental specifications. Hardware specifications also can be found in the pre-installation guide for the product(s) purchased.



• **Outbound Vital Signs**-Collects patient vital signs data from acquisition devices and transfers to hospital's information system, with an available integrated test environment. Data retention and auto backfill feature if network(s) is down. Four concurrent feeds available.

• **ADT Inbound**-Collects patient demographic information from the hospital's information system and transfers it, when requested, to the patient monitoring devices or CARESCAPE CIC Pro central station. Includes wildcard pick-list search feature.

• **Network Time Protocol (NTP)**-The CARESCAPE Gateway can sync to a hospital's NTP time source to provide synchronized time across the patient monitoring devices on the CARESCAPE Network. In addition, the CARESCAPE Gateway can automatically configure the system to adjust to daylight saving time. Furthermore, the CARESCAPE Gateway provides an NTP time service, which the iCentral can use to synchronize time.

• **High-speed Data**–Near-real-time waveform and numerical data can be provided to clinical information systems and researchers (requires third-party application development). Up to three concurrent feeds are available. Some third-party vendors also may require Outbound Vital Signs feed.

2.0 Implementation teams

2.1 Team roles and responsibilities

The success of a CARESCAPE Gateway system implementation depends on critical factors such as leadership, project planning, effective communication, and proficient execution of tasks. Teams with defined project goals and objectives will deliver a more timely and efficient project implementation.

Guidelines for team members' roles and responsibilities are outlined below. Depending on the size, scope, complexity, and degree of customization involved in the system implementation, some roles may either be combined or further subdivided. However, the overall responsibilities of these roles will remain as defined under these guidelines. If any roles and responsibilities need to be modified to meet the specific needs of the project, the changes should be documented, communicated, and agreed upon by the Project Team.

The Project Team is composed of both GE and hospital personnel. All team members should review the following team member definitions and responsibilities.

Customer core team members

Project Manager (PM)–Maintains overall responsibility and authority for project activities. This person will be the central contact for planning meetings, scheduling site visits and gathering/disseminating any documentation that needs to be provided to the GE Project Team throughout project implementation.

Biomedical Engineering Director/Manager-Represents the customer on medical equipment requirements, specifications, and standards. This person should be familiar with both the physiologic monitoring equipment and network interfaces.

Information Technology Director/Manager (IT)-Provides the knowledge and authority needed to represent the IT department throughout the planning, installation, and GoLive phases of the project. It is imperative that this person be authorized to represent network and interface standards and policies for the hospital. IT will be responsible for coordinating resources for the remote connectivity and interface interconnectivity team to assist with configuration.

HIS Interface Analyst -Provides HIS interface requirements to GE Healthcare HL7 Integration Engineer and supports build and test of the HIS interface within the timeline established in the overall project plan.

Clinical Analyst–Responsible for inbound and outbound HIS testing. This person has access to the HIS test configuration for initial testing of the interface modules. They also may be involved with system workflow and clinical training needs of the department.

Nursing Director/Manager-Represents the clinical aspects of the project, including system configuration, equipment placement, and hospital monitoring policies and standards. This person must have the knowledge and authority to represent the clinical needs of the organization as they relate to this project. This person also will assess the need for user training and will coordinate such training activities with the GE implementation team.

Facilities Manager-Represents the customer on electrical, mechanical, carpentry, and telecommunications standards. The Facilities Manager is the main point of contact for hospital buildings, trash disposal, power, HVAC, and telecommunications, and provides GE access to hospital loading dock and equipment staging areas, if required.

GE Core Team members

Project Manager or Account Coordination Specialist (PM/ACS)-Provides leadership and serves as primary contact of the GE core project team for the successful planning, execution, and acceptance of the GE system(s). The GE PM or ACS works with GE and customer project teams to coordinate all implementation activities, resources, documentation, and training.

Field Engineer (FE)-Performs on-site survey, if required. Coordinates and performs system installation and provides GoLive support. The Field Engineer coordinates with hospital personnel and leads GE installation team members and contractors in completing the system implementation.

Network, Design and Implementation Engineer (ND&I)-Responsible for generating a network design that addresses both customer and GE requirements, per purchase. Identifies and documents current network design pre-sale, identifies new network requirements, determines whether existing network upgrades are required, creates new network design, configures router, and collaborates with the core team to configure and validate VPN connectivity.

HL7 Integration Engineer (IE)-Defines CARESCAPE Gateway interface specifications, establishes integration plan, and develops interface design, configuration, and test plan. The HL7 Integration Engineer also performs remote system tests prior to, during, and post-GoLive. Also acts as the primary point contact 45 days post GoLive.

Sales Representative-Defines requirements and sets customer expectations throughout the sales process. Obtains architectural drawings prior to the site survey and provides quotes for any additions to or changes in scope. Responsible for initiating any required surveys.

3.0 Additional responsibilities

3.1 Customer responsibilities

The customer is responsible for the following tasks prior to and during implementation of the CARESCAPE Gateway. All action items will be reviewed in detail during project kickoff. Unavailability of or delays in providing certain items prior to installation may result in delayed GoLive and/or additional customer cost. **Please note that any changes to the project schedule require advance mutual agreement.**

Project management
The customer will assign a primary contact person to assist with the development and testing of the interface between the Mission Critical (MC) network and Hospital Information System (HIS). This person will assemble customer resources and requirements as needed throughout the implementation process and is responsible for the implementation schedule and deliverables owned by the customer.

Vendor credentialing
If an on-site visit is required by the GE team, throughout the project, the customer will provide any information needed for vendor credentialing prior to the site visit.

Document approval
The customer will provide at least one person to approve documents created throughout the project purchase. This person is responsible for coordinating timely customer review of, response to, and approval of project documentation.

Interface specifications
The customer is responsible for providing complete specifications for communication and data protocols, routing rules and translations, as referenced in the CARESCAPE Gateway Interface Configuration Worksheet. These requirements will be used to develop the Interface Specifications. The CARESCAPE Gateway Interface Configuration Worksheet must be completed and submitted to GE in order to initiate implementation.

Architectural drawings
Prior to the scheduled site survey, the customer is responsible for providing multiple sets of full-scale, hardcopy architectural drawings, as well as electronic (AutoCAD®) drawings for all of the antenna coverage areas and equipment locations. Coverage areas and closet locations should be marked with a highlighter on the hardcopy drawings, and care unit names should be clearly identified. AutoCAD files shall include floor plan and room number/name layers.

Equipment placement and security
The customer is responsible for identifying equipment placement locations prior to site survey and for assuring the availability of these spaces during installation. The network equipment locations shall have controlled access and environmental controls. The customer shall provide members of the GE implementation team with access to secure locations as needed. Any subsequent change in equipment placement will likely cause a delay in project completion. The customer will be responsible for any applicable costs associated with the change.

Closet location and rack/space allocation

The customer is responsible for providing adequate communication closet space, environmental control, and power source for installation of system network components. The ND&I team will review the closet locations noted on the customer's architectural drawings and provide the requirements to the hospital at the end of the site survey.

Equipment storage and transportation

It is the customer's responsibility to receive all system components shipped to the hospital, including hardware and installation materials. The customer is also responsible for equipment transportation from the receiving dock to its designated storage and/or staging location(s). The customer is responsible for the proper and secure storage of the equipment.

Cable installation

Depending on the networking level purchased, it may be the customer's responsibility to install, terminate, and/or certify cables per system design. In any case, it is the customer's responsibility to identify any unique color and/or labeling requirements for network cables and wall plates.

Fiber connectivity

Certain products offer billable options for network integration. Please refer to your sales contracts for details. If the network integration option is not purchased, fiber installation, termination, and certification are the responsibility of the customer to follow the specifications recommended by GE.

Carpentry and construction

The customer is responsible for all carpentry and/or construction work required for installation of GE CARESCAPE and/or monitoring equipment. Millwork required to house system components, installation of grommets and/or vertical wall channels, and any other construction required for the monitoring system will be the responsibility of the customer. If a server is to be located in a cabinet, the cabinet must be equipped with a cooling fan.

Electrical outlets

The customer is responsible for providing all electrical outlets required for the CARESCAPE Gateway system and networking components. It is recommended all electrical supplies be on the hospital's emergency power system and have generator backup.

Core drilling

All core drilling-vertically and/or horizontally-shall be the responsibility of the customer regardless of whether the customer or GE pulls cable.

Conduit

GE does not require horizontal cable runs to be in conduit. If conduit is required by the hospital, installation of any new conduit is the responsibility of the customer.

Local codes and special requirements

At the beginning of the project, the customer must inform the GE PM/ACS of any local codes and/or special requirements to which the installation team must adhere. Necessary permits and/or inspections must be secured by the customer. If hospital or local labor requirements preclude GE from using its own employees and nonunion contractors for the installation, all installation work shall be performed by the customer at their own expense and without reimbursement from GE.

Infection control & dust containment

It is the customer's responsibility to inform the GE sales team prior to final quotation of any infection control and/or dust containment requirements. Such infection control and/or dust requirements can add to the duration and cost of system implementation. For dust containment, GE will provide carts and hepa filter vacuums, as needed. Any additional required infection control equipment and/or garments shall be provided by the hospital for use by GE during installation

Asbestos and hazardous conditions

The customer must inform the GE PM/ACS at the beginning of the project if there is any asbestos or industrial hazard with which the installation team members may come in contact. Proper abatement and removal of hazards must take place at customer expense before any GE personnel will begin or resume work.

Refuse disposal

GE will make every effort to keep refuse, such as packing materials and shipping cartons, organized and stowed away during installation. It is the responsibility of the hospital to make arrangements for the proper disposal of the installation refuse.

Uninterruptible power sources

Uninterruptible Power Sources (UPS) are required for all network components. UPS for monitoring equipment are optional purchase items highly recommended by GE. If the customer chooses to supply the UPS, it is the responsibility of the hospital to ensure that the UPS meet GE product specifications. In any case, the customer is responsible for ongoing maintenance of the UPS.

Assigned IP addresses

GE CARESCAPE products come with pre-assigned IP addresses. If an alternate IP address scheme is required, the customer is responsible for assigning permanent IP addresses for the CARESCAPE Gateway system.

Remote system support

The customer will provide all communication configuration required to connect to the CARESCAPE Network and/or HIS. Customer also will provide technical support to GE technical staff. The customer will provide the resources necessary to evaluate communications problems involving cabling, communications facilities, primary business system software/hardware configuration and/or remote system configuration.

The customer will act as the liaison between GE and any third-party vendors in the resolution of any remote system support issues. The customer will assign a person to assist during installation and testing of the system. This person will be responsible for initiating transmissions from the remote system and viewing transmissions received from the CARESCAPE Gateway interface.

The CARESCAPE Gateway uses a LAN to LAN Virtual Private Network (VPN) connection and InSite™ ExC between the hospital network and GE. This connection is used for remote configuration of the interface and to support service requests. An existing GE VPN or InSite ExC connection can be updated to include the CARESCAPE Gateway. If a new VPN connection is required, GE will work with the customer to establish this connection prior to installing the CARESCAPE Gateway server.

Customer-supplied equipment

The customer is responsible for ensuring all hospital-supplied parts, equipment, and furniture will be available on time, as agreed per the project timeline. Any delay on these items will impact the schedule and may delay the project GoLive. The customer must proactively ensure the equipment and supplies purchased outside of GE meet applicable minimum specifications for use with the GE CARESCAPE system, and the customer is responsible for installing any hardware not purchased from GE.

Peripheral interface

The customer is responsible for the provision, setup, and support of any peripheral interfaces, such as laser printers and print-sharing devices that are hospital-supplied and purchased from a third-party vendor.

System test plan

The customer will facilitate the resources and requirements needed to create the overall system test plan. Once GE delivers the system test plan for ADT and/or Results to the customer, the customer will facilitate necessary reviews and obtain all required approvals.

System test

The customer is responsible for testing each transaction to confirm that it works in accordance with the Interface Specifications Document. Customer approval of the System Test constitutes formal acceptance, indicating that the system meets the requirements of the customer as represented in the Interface Specifications Document and System Test Plan.

System GoLive

The GE implementation team will assist the customer team remotely for the CARESCAPE Gateway GoLive and the resolution of any issues that may develop.

3.2 GE responsibilities

GE is responsible for the following tasks prior to and/or during the CARESCAPE Gateway implementation.

Project management

GE will assign a Project Manager and/or Account Coordination Specialist to coordinate the planning, installation, development, and testing of the interface between the Mission Critical Network and HIS. This person will assemble GE resources and requirements as needed throughout the implementation process and is responsible for the implementation schedule and deliverables owned by GE.

Scheduling

GE will work with the customer to coordinate resources for installation, interface development, testing, and GoLive. A typical CARESCAPE Gateway installation will take approximately eight to 12 weeks from initial project kickoff to the start of customer testing. A minimum three-week notification period is required to schedule GE resources.

Hours of operation

The project team meetings, installation, HL7 configuration, and testing will be performed during normal GE business hours of 8 a.m. to 5 p.m. local customer time. If a customer wishes for the installation or upgrade to begin outside of those normal business hours, they will be subject to additional fees associated with the overtime hours.

Interface specifications document

The GE HL7 Integration Engineer will obtain and review the technical specifications and data gathered in preparation for building the interface. GE will create an Interface Specifications Document to be reviewed and approved by the customer. Information in this document includes: hardware platforms and operating systems of each HIS, network and protocol data information, mapping of data elements of Sending System to data elements of Receiving System, current record/date elements layouts, missing data elements from Sending System, data generation requirements, issues/exceptions, message formats, and translation requirements.

Router or remote connectivity

If an InSite ExC compatible product is purchased, GE will provide, install, and configure the router necessary to bridge between the monitoring network and the hospital's enterprise network. In some cases, a router may not be required.

Installation of network infrastructure

Depending on the networking purchased, GE may be responsible for some or all of the following: system network design, supplying infrastructure parts, cable pulls, termination, network installation, and certification of the network.

Equipment installation

GE will ship the pre-configured hardware directly to the customer site according to the address specified on the purchase order. Hardware platforms are affixed with product and serial number labels that uniquely identify the devices for product traceability and warranty entitlements. GE will install, configure, test, and validate all system components.

Remote system support
Upon successful installation of the equipment, GE will establish communications with remote systems by configuring the operating system and CARESCAPE Gateway test environment for appropriate protocols, verifying communications at the protocol level to/from remote systems and capturing raw data from remote systems. The remote connectivity software validated for use with the CARESCAPE Gateway is InSite ExC and Virtual Network Computing (VNC).

The CARESCAPE Gateway also requires a LAN to LAN VPN and InSite ExC connection between the hospital network and GE. This connection is used for remote configuration of the interface and to support service requests. An existing GE VPN or InSite ExC connection can be updated to include the CARESCAPE Gateway, or, if a new connection is required, GE will work with the customer to establish this connection prior to installing the CARESCAPE Gateway server.

Equipment configuration & interface development
GE will schedule equipment configuration and interface development only after remote system support capabilities have been established. Equipment configuration and interface development will be performed remotely by the HL7 Integration Engineer as outlined in the Interface Specifications Document.

System test plan
GE is responsible for creating a System Test Plan based on the CSG Interface Configuration Worksheet. The HL7 Integration Engineer will identify the programs, procedures, and standards for performing the integration testing on the system and map the expected interface results. The test plan document will be forwarded to the customer for review and approval upon completion.

System test
GE will perform system testing by verifying that the Mission Critical Network delivers its messages as defined in the System Test Plan. The HL7 Integration Engineer will unit-test each transaction that comes across the interface to verify that data formats were sent and received as defined in the Interface Specifications Document and that data is correctly processed by the CARESCAPE Gateway interface. The team also will perform integration testing using production-volume data loads, evaluate the test results, and make any necessary change. The team will continue to repeat this testing until results meet the requirements of the System Test Plan.

Customer training
GE will perform system operator training on the system as stated in the sales agreement. If remote training was not purchased as part of the CARESCAPE Gateway implementation, the customer may refer to the CARESCAPE Gateway Operator Manual included with the system for operational details.

GoLive
GE will be responsible for converting the interface(s) to operation on actual production data transmissions and verifying the interface performs in accordance with the requirements of the Interface Specifications Documentation. The HL7 Integration Engineer will conduct the GoLive remotely during normal business hours, unless otherwise stated in the sales agreement. The GoLive will be successfully completed when the system is processing actual transactions in a manner that is consistent with the Interface Specifications Documents and the results of the System Test Plan.

Site documentation

GE will provide a copy of the implementation documentation to the customer following successful completion of system GoLive. The documentation will contain all relevant information pertaining to the CARESCAPE Gateway interface implementation.

4.0 Project actions and ownerships

The GE implementation consists of the major activities listed below. Most of the planning and decisions are made in project meetings and discussions that focus on the preparation and implementation of these activities. The following is a list of tasks and their ownership to help team members manage and track their progress. Based on the scope, complexity, and product(s) purchased, some key actions may not apply.

Key actions

- Initiating
- Planning
- Executing
- Monitoring and controlling
- Closing

4.1 Initiating

This phase consists primarily of an internal exchange of information intended to familiarize the GE Core Team with the scope of the project and prepare for the project kickoff.

Information gathering		
Task	GE	Customer
1 Provide multiple sets of full-scale, hardcopy architectural drawings, as well as electronic (AutoCAD) drawings marked up with all equipment and network closet locations	Sales	PM
2 Obtain copy of sales order	PM/ACS	
3 Provide completed CARESCAPE Gateway Interface Configuration Survey to PM/ACS	Sales	
4 Provide customer contact information	Sales	
5 Contact customer for introductory project discussion and to schedule Kick Off meeting	PM/ACS	PM
6 Estimate project timeline and resources	PM/ACS	
7 Allocate resources and form implementation team	PM/ACS	
8 Submit CARESCAPE Gateway Interface Configuration Survey to HL7 team	PM/ACS	
9 CARESCAPE Integration Request for to be submitted to the Network Connectivity Team	PM/ACS	
10 Conduct call with GE implementation team to review sales order and high-level project scope	Core Team	

4.2 Planning

The intent of the Planning Phase is to assemble the customer core team and conduct the Kick Off meeting. During this phase, a preliminary timeline will be established. If necessary, follow-up meetings or calls also will be scheduled at this time.

Project kick off			
	Task	GE	Customer
1	Generate Project Book and project-specific documentation	PM/ACS	
2	Provide customer with necessary project documentation	PM/ACS	
3	Conduct Kick Off meeting (on-site or via teleconference)	PM/ACS	Core Team
	a. Review project scope and system configuration based on sales agreement(s)	Core Team	Core Team
	b. Review customer and GE roles and responsibilities	Core Team	Core Team
	c. Review actions, tasks, and ownership	Core Team	Core Team
	d. Identify third-party vendor roles, responsibilities, and contacts, if applicable	Core Team	Core Team
	e. Review training based on sales agreement(s)	Core Team	Core Team
	f. Review implementation timelines and target GoLive date	Core Team	Core Team
4	Allocate resources based on GoLive schedule	PM/ACS	PM
5	Define mechanism and frequency of future project communications	Core Team	Core Team
6	Document any open issues and/or action items	PM/ACS	
7	Publish and distribute Project Book and project implementation schedule	PM/ACS	

Site survey			
	Task	**GE**	**Customer**
1	Conduct site survey	FE and/or ND&I	PM, IT, Biomed, Facilities
2	Identify closet and rack space requirements	FE and/or ND&I	
3	Identify any electrical, facility, and/or carpentry requirements	FE and/or ND&I	Core Team
4	Hospital commits closet and rack space		PM, IT, Biomed, Facilities
5	Hospital assigns IP addresses, if required		PM, IT
6	Update workbook to document site survey results	FE and/or ND&I	

System design			
	Task	GE	Customer
1	Confirm complete site survey deliverables have been submitted to ND&I	FE and ND&I	
2	Perform system design, as per purchase agreement	ND&I	
3	Design review and approval	ND&I	
4	Submit infrastructure parts order with required ship date, as per purchase agreement	ND&I	
5	Document and post completed design	ND&I	

4.3 Executing

This phase includes equipment delivery, system installation, HL7 configuration and testing and GoLive readiness.

Equipment delivery and installation			
	Task	**GE**	**Customer**
1	Configure router and ship to customer	ND&I	
2	Schedule and confirm on-site delivery of server, router, and network components	PM/ACS	PM
3	Complete any power and network requirements, based on specifications provided		Facilities, IT
5	Confirm completion of remote connectivity prior to GE arrival for on-site installation	FE. ND&I	PM
6	Perform physical inventory	FE	Biomed, Facilities, IT
7	Install Category 5 and/or fiber-optic network cabling, if required[1]	FE, Contractor	Facilities, Contractor
8	Rack, power, and network GE hardware	FE	IT
9	Install and configure GE equipment	FE	
10	Test remote support connection	FE, ND&I	

[1] Cable installation may either be the responsibility of GE or the customer. Please refer to sales agreement for appropriate terms and conditions regarding cable installation.

Interface specifications, configuration, and testing			
	Task	**GE**	**Customer**
1	Schedule discussion with customer and HL7 Engineer to discuss CARESCAPE Gateway Interface Configuration Survey	PM/ACS, HL7 Engineer	PM, HIS Interface Analyst
2	Develop interface specifications document and system test plan, if necessary	HL7 Engineer	HIS Interface Analyst
3	Forward final Integration Specifications Document and System Test Plan to customer PM for review and acceptance, if necessary	HL7 Engineer	
4	Configure HL7 interface box for testing	HL7 Engineer	Facilities, IT
5	Perform HL7 Connectivity Testing	HL7 Engineer	HIS Interface Analyst
6	Perform end user HL7 integration testing	HL7 Engineer	HIS Interface Analyst, Super User
7	Validate HL7 workflow testing is complete and GoLive	HL7 Engineer	
8	Perform full backup of CARESCAPE Gateway and Quovadx® settings	HL7 Engineer	
9	Familiarize customer with final CARESCAPE Gateway configuration and functionality	HL7 Engineer	HIS Interface Analyst, Super User
10	Obtain necessary department acknowledging HL7 readiness		PM

GoLive readiness			
	Task	GE	Customer
1	Finalize interface configuration	HL7 Engineer	HIS Interface Analyst
2	Discuss service support plan	HL7 Engineer	
3	Finalize interface documentation	HL7 Engineer	
4	Institute routine systems maintenance administration	HL7 Engineer	IT
5	Conduct pre-GoLive status call to confirm completion of customer interface preparation activities	Core Team	Core Team

4.4 Monitoring and controlling

This phase includes final system checks and the transition to a live production environment.

System GoLive			
	Task	GE	Customer
1	Transition to live production environment	HL7 Engineer	IT
2	Online production cutover	HL7 Engineer	IT
3	Verify performance of system(s) including communication with external devices	FE	
4	Perform system backup	HL7 Engineer	IT
5	Conduct GoLive status call	Core Team	Core Team
6	Review HL7 Admin Training Documentation	HL7 Engineer	IT, Biomed

4.5 Closing

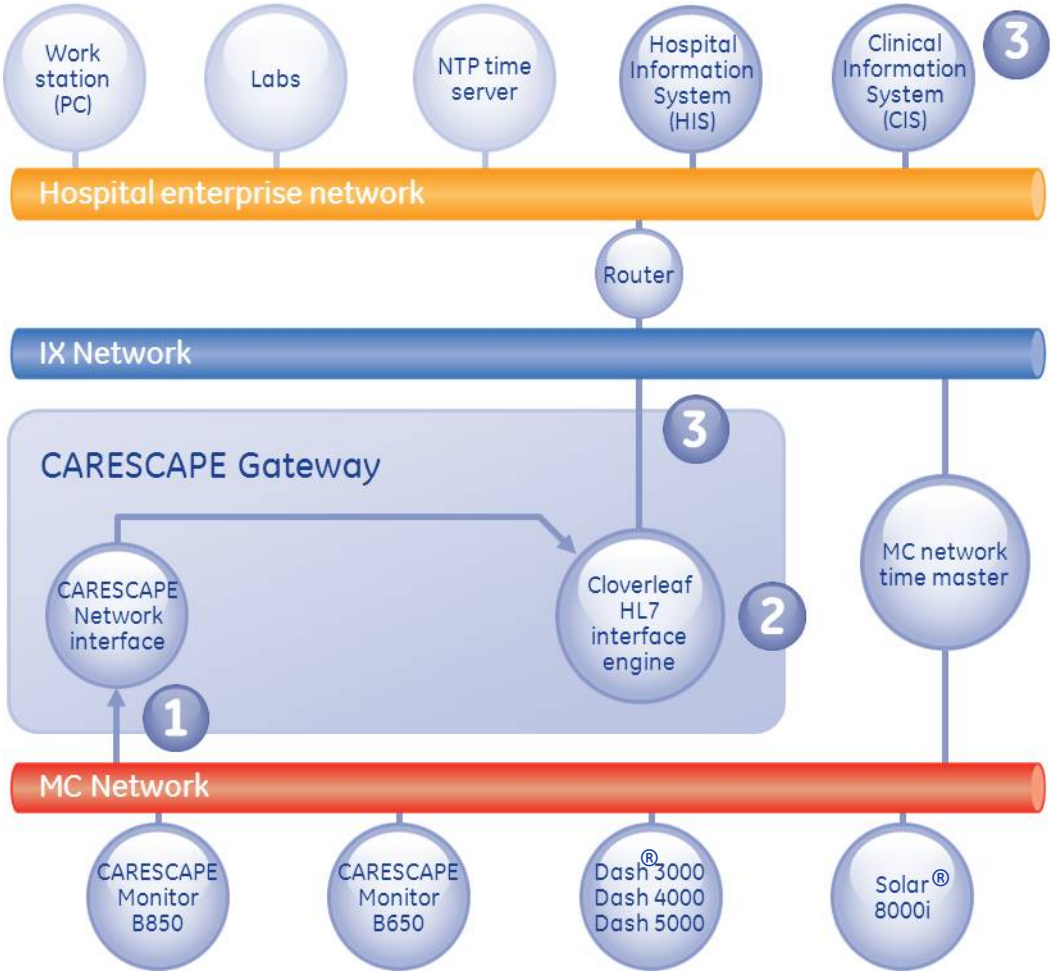
The Closing Phase ensures that any open items have been documented and assigned for completion, and formalizes final system acceptance in accordance with GE standard Terms and Conditions. This phase provides project closure and a detailed plan for ongoing customer support.

Project closure			
	Task	**GE**	**Customer**
1	Conduct Closeout meeting	Core Team	Core Team
2	Review system performance, project commitments, and post-GoLive support during Closeout meeting	Core Team	Core Team
3	Review open issues and establish follow-up plan	Core Team	Core Team
4	Forward Close out letter and initiate delivery of customer Closeout package	PM/ACS	

5.0 CARESCAPE Gateway feature overview

5.1 Outbound vital signs data flow

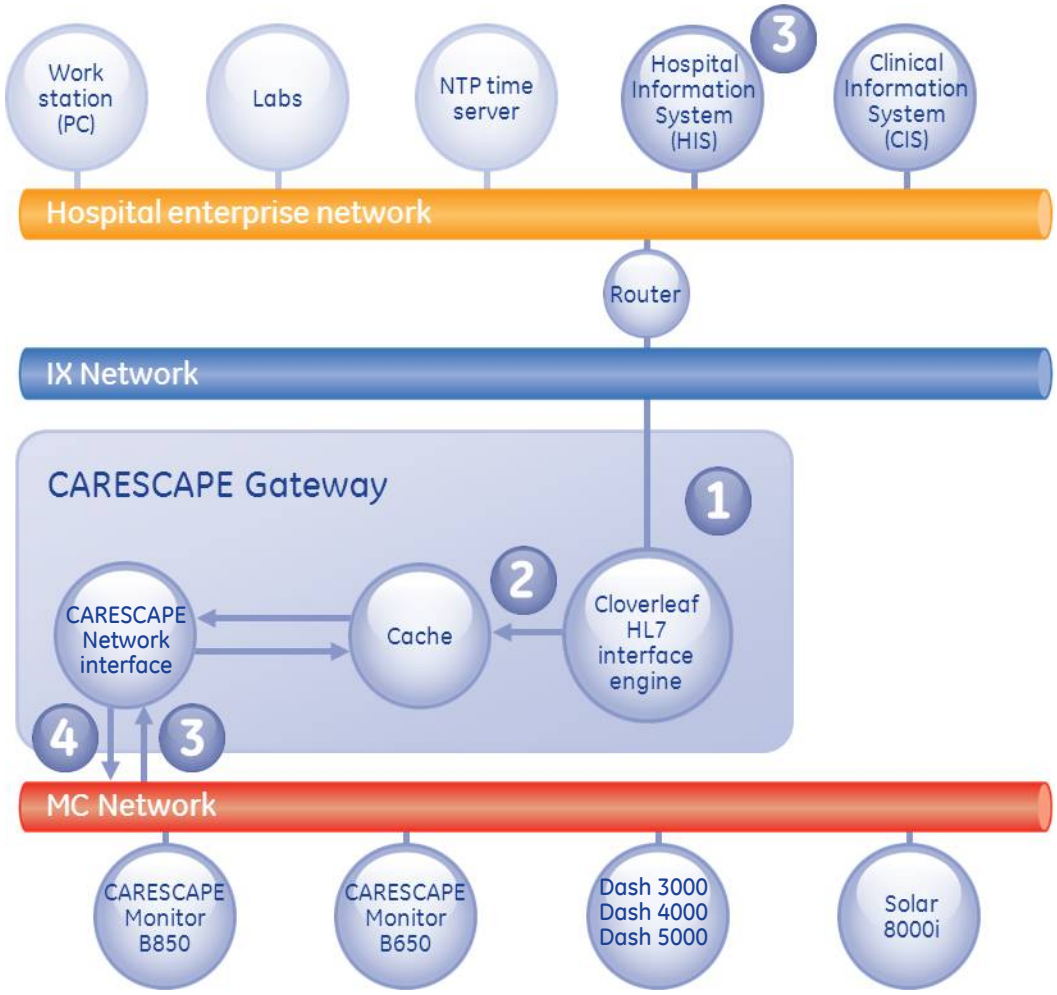
The Outbound Patient Vital Signs feature takes trended patient data from the monitors on the Unity MC Network and transmits it to the HIS.



1. The CARESCAPE Gateway acquires patient data from up to 512 patient monitoring devices on the CARESCAPE Network.
2. The built-in Cloverleaf interface engine translates the data to the specific needs of the Clinical Information System utilizing the HL7 protocol.
3. Translated HL7 trended vital signs data is transferred to the Clinical Information System.

5.2 ADT Inbound data flow

The ADT Inbound feature takes patient ID data from the HIS and transmits it on demand to the monitors on the Unity MC Network.

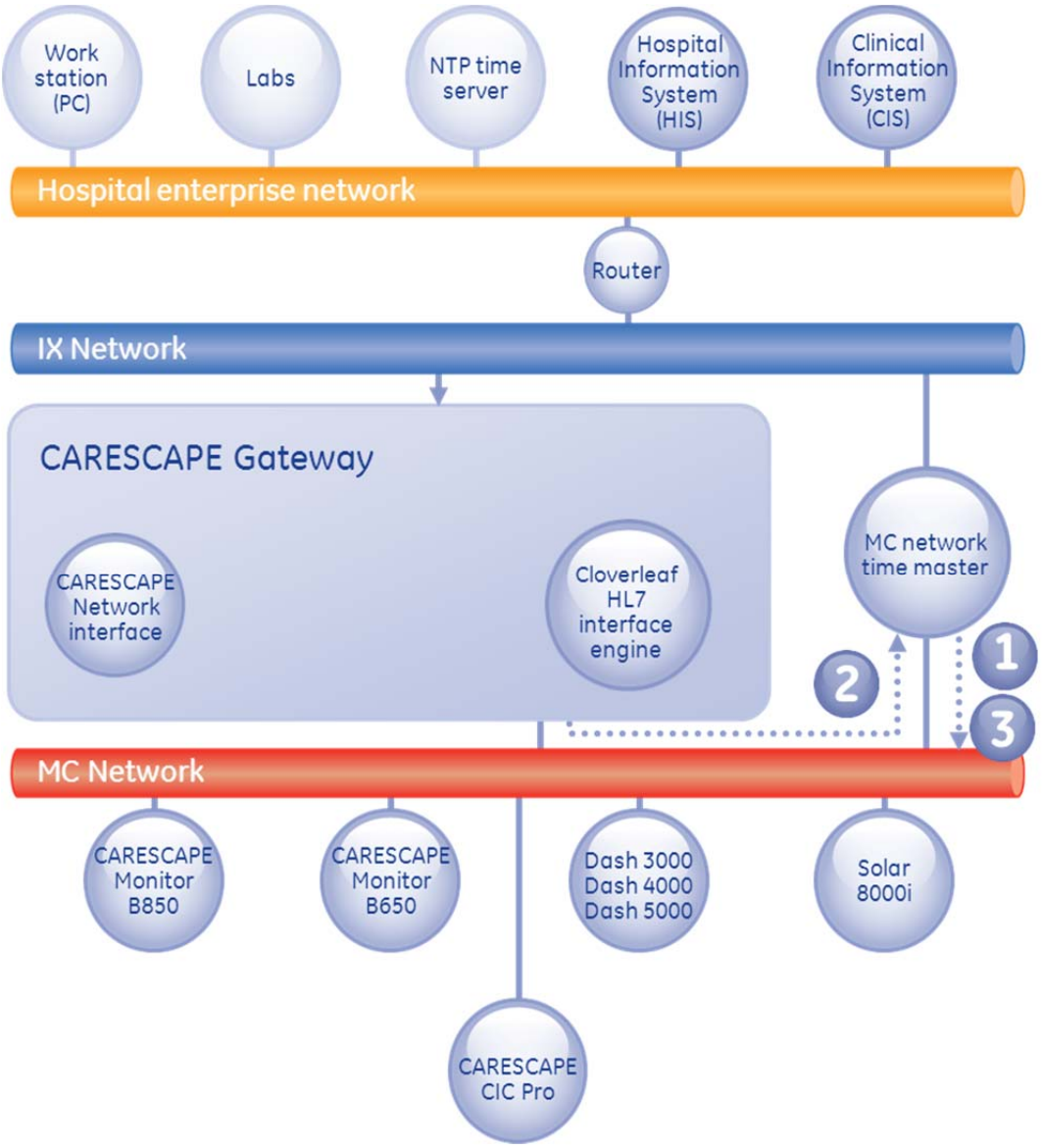


1. Patient ADT information streams from the HIS in HL7 format to the CARESCAPE Gateway as patient data is added or modified.
2. Patient data is converted by the Cloverleaf HL7 interface engine and held in database.
3. A monitor on the MC Network sends a query for patient data to the database on the CARESCAPE Gateway.
4. Data is retrieved from the cache and sent to the requesting monitor on the MC Network.

Note: The ADT feature on the CARESCAPE Gateway is for the CARESCAPE Network and does not include the S/5 Network.

5.3 NTP data flow

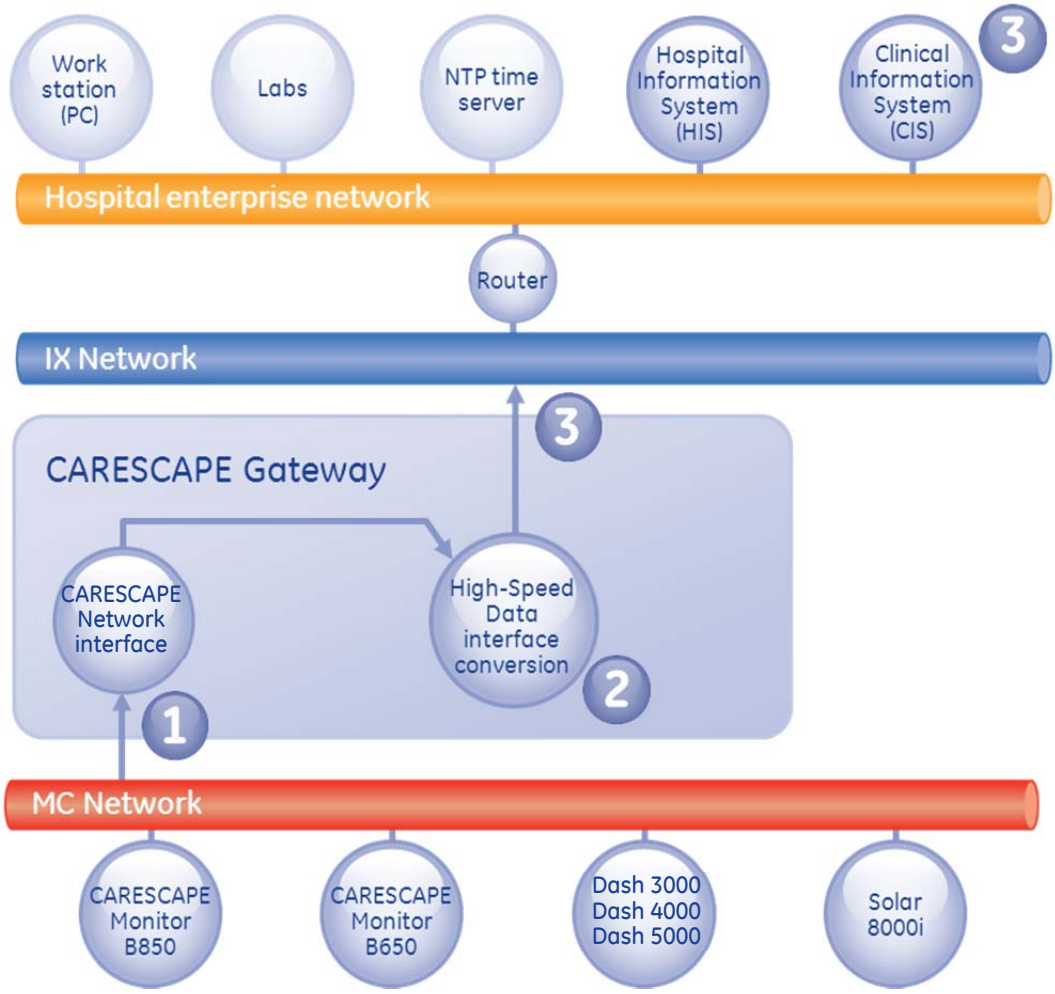
The NTP time synchronization features compares time on the Unity Network to the hospital's NTP Time Server and transmits it to the time master on the Unity MC Network, usually a CARESCAPE CIC Pro.



1. If there is no NTP configuration, the CARESCAPE Network time master will automatically re-sync time with the monitors at 7 a.m. every morning.
2. If NTP configuration is enabled, the CARESCAPE Gateway will continually check if the time comparison to its internal clock is substantially different (>10 secs). If the CARESCAPE Gateway detects a variance of >10 seconds, a message is sent to the MC Network time master to adjust its clock to match the NTP server time.
3. The MC Network time master broadcasts the new time to all devices on the MC Network, which adjust their clocks to the new time.

Note: Automated or manual adjustments to the time or date settings, including daylight saving time changes, may affect other monitoring devices on the Unity Network and could result in a loss of patient data history. Please contact your HL7 Integration Engineer for detailed information regarding NTP operation.

5.4 High-speed data flow



1. The CARESCAPE Gateway acquires patient data from up to 512 patient monitoring devices on the CARESCAPE Network.
2. Patient data is converted into the High-speed Data format inside the CARESCAPE Gateway.
3. The High-speed Data is exchanged between the CARESCAPE Gateway and is transferred to the Clinical Information System.

5.5 Supported devices

CARESCAPE Gateway works with bedside monitoring devices that support Patient Identification (PID) and Admit-Discharge-Transfer (ADT) functionality. The following table identifies the GE monitoring devices that have been validated with CARESCAPE Gateway, at the time of this printing.

Device	Versions	Outbound Vital Signs	Supports ADT Request Admit[1]	Supports ADT Picklist
ApexPro®	3.9, 4.0, 4.1, 4.2	Yes	Using Central Station	No
CARESCAPE B650	1.1	Yes	No	Yes
CARESCAPE B850	1.0	Yes	No	Yes
CDT-Lan[2]	6D[3]	Yes	Using Central Station	No
CIC Pro	4.0.7, 4.1.0, 4.1.1-2, 5.1.0, 5.2	N/A	Yes	No
CIC Pro	5.1.0, 5.2	N/A	Yes	Yes
Dash 2000	3A, 3B	Yes	Yes	No
Dash 3000/4000/5000	2B, 2C, 3B, 3C, 3D, 4B, 4C, 5.1, 5.2, 5.3, 5.4, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9	Yes	Yes	No
DINAMAP® Pro 1000/1928 Adapter v1	V2 HW, RAH SW; V2 HW, RAJ SW; V2 HW, RAK SW; V3 HW, RAA SW; V3 HW, RAB SW; V3 HW, RAC SW; V3 HW, RAD SW; V3 HW, RAE SW; V3 HW, RAF SW; V3 HW, 1A SW; V3 HW, 1B SW	Yes	Using Central Station	No
Eagle® 3000	3A,[3] 3B[3]	Yes	Using Central Station	No
Eagle 3000	4A, 4C	Yes	Yes	Yes
Eagle 4000	5B,[3] 6A, 6B, 6C, 6E, 6F, 6G	Yes	Using Central Station	No
iCentral[4,5]	LNET05 05.0.3, LNET05 5.1, LNET05 05.0.3, LNET05 5.1.1, LNET05 5.1.2	Yes	No	No
Solar 7000/8000	3C, 4B, 4C	Yes	Using Central Station	No
Solar 7000/8000	5B, 5D, 5E, 6A, 7B, 7C	Yes	Yes	No
Solar 8000M	1A, 1B, 1C, 2A, 3D, 4C, 4D, 4E, 4F, 5.2, 5.3, 5.4	Yes	Yes	No
Solar 8000i	4E, 4F, 5.2, 5.3, 5.4	Yes	Yes	No
Solar 9000/9500	3C, 4A, 4B, 4C	Yes	No	No

Tramscope 12	17F,[3] 17G,[3] 17H[3]	Yes	Using Central Station	No
Unity Network ID	1A, 3B, 4A, 4B, 5B, 5C, 5D, 6A	Yes	Using Central Station	Yes

[1] TRAM Module software earlier than v10A does not support storing a PID. When an earlier version of TRAM Module is used with an ADT-capable patient monitor, the PID will not be stored.

[2] This device is only supported in one-minute collection interval. *Using central station* indicates that the device does not support ADT Request Admit directly. However, the transfer of patient demographic information can be performed at the central station.

[3] CDT-LAN v6A does not support storing a PID.

[4] The iCentral is the only S/5 Network device to which the CARESCAPE Gateway directly communicates. See iCentral documentation for patient monitor and module compatibility.

[5] ECG is not supported for S/5 Network devices for any of these cases: monitor's DRI level set to 2002 or earlier, M-NE12STPR..00/01 module is used, and M-NESTPR module is used with a monitor that has software level older than 04.

6.0 Technical requirements

The CARESCAPE Gateway has several requirements that must be met in order to ensure a successful implementation. The list below will be used as a guideline to develop specific requirements based on the unique requirements of your site.

6.1 Space and access

GE requires a site survey process to validate the customer-determined location for the CARESCAPE Gateway system. The CARESCAPE Gateway and related components require adequate mounting space, preferably in a controlled IT data center with available rack, power, and network access. Following mutual acceptance of this location, GE will require periodic access to the location for installation and implementation of the system.

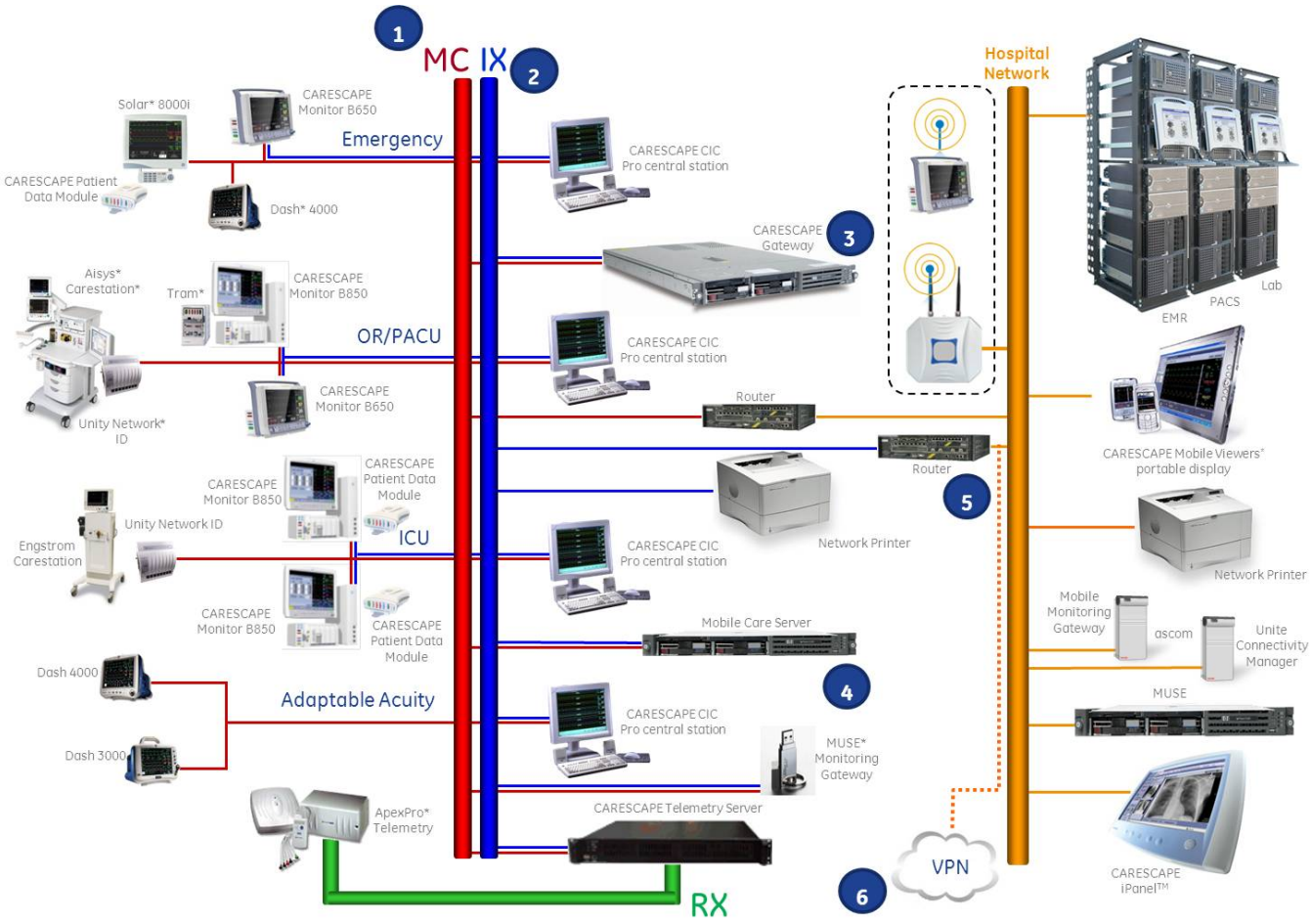
6.2 Network infrastructure

The GE network infrastructure supports industry standard 100BASE-T (UTP cable) and 100BASE-FX (multimode fiber optic) interconnectivity. Both of these media provide 100 Mbps full duplex throughput.

GE requires that all GE monitoring connections, both cabling and LAN equipment, be dedicated to the monitoring system due to the life-critical and mission-critical natures of a patient monitoring system. GE's patient monitoring infrastructure consists of two networks. The Mission Critical (MC) network provides real-time data between GE devices, and the Information Exchange (IX) network provides non-real-time data, such as print requests and license processing.

The CARESCAPE Gateway will require connection to both the patient monitoring Unity MC Network and the Hospital Information System network via a secured connection to the Unity IX Network.

The CARESCAPE Gateway also requires a LAN to LAN VPN connection between the hospital network and the GE Regional Operations Center (ROC). This connection is used for remote configuration of the interface and to support service requests. An existing GE ROC VPN can be updated to include the CARESCAPE Gateway, or, if a new VPN connection is required, GE will work with the customer to establish this connection prior to installing the CARESCAPE Gateway server.



1. **GE Unity MC Network**-Separate network for GE medical devices (monitors, telemetry, central stations, etc.) to transport life-critical data.
2. **GE Unity IX Network**-Separate network for GE medical devices to transport non-life-critical data. (In the past, this could have used the hospital network.)
3. **CARESCAPE Gateway**-Provides an interface to pass ADT info to monitors and numeric vital signs data (HL7) to an HIS/CIS.
4. **Application Servers**
    - **Mobile Care Server**-Provides enhanced data storage (72 hours of vital signs and 500 alarm histories) and network-based data continuity).
    - **Patient Viewer**-Provides a remote view of patient monitoring information, including ECG waveforms and vital signs.
    - **MUSE Monitoring Gateway**-Provides an interface to allow the bedside monitors (if equipped) to send 12-lead ECG reading to the MUSE.
5. **CARESCAPE Network Router**-Provides a controlled connection point to limit what traffic is allowed to pass between the hospital network and the Unity Network.
6. **GE InSite ExC/VPN Solution** - Provides a broadband connection for configuration, remote support, and diagnostics.

6.3 Network materials

The GE CARESCAPE network backbone cabling is standard 62.5/125 micron multimode fiber, terminated to SC connectors at the fiber connection panel. The GE Network, Design and Implementation Engineer must approve use of another type of connector in advance.

All copper network cabling conforms to TIA-568 standards for Cat5E UTP. All segments in plenum spaces are plenum rated cable. All dedicated UTP patch panels also conform to TIA-568 standards for Cat5E UTP. Confirm this with ND&I and FE

6.4 Remote connectivity

Certain GE products are equipped with InSite ExC, a digital services interface that allows remote access to the GE Healthcare Support Center via a secure Internet connection to enable On-Demand or Proactive Digital Services. Use of InSite ExC requires a physical connection through a router supplied by GE to the hospital's existing enterprise LAN and outbound Internet access for the device using HTTPS protocol. Hospital IT staff will be asked to provide information and actions required for the digital services interface. Please refer to the product brochure for additional details.

6.5 Closets

- Adequate space shall be provided in designated equipment closets to house GE infrastructure components.
- Closets shall be made accessible for the GE installation team during all phases of implementation for the purposes of installing, integrating, testing, and troubleshooting the CARESCAPE system.
- Proper ventilation and/or cooling shall be provided in designated equipment closets. Ambient temperature immediately surrounding the distribution racks should be no more than 35 C.

6.6 AC power

Hospital emergency power must be provided for GE CARESCAPE system(s) and infrastructure components. Separate AC outlet(s) with sufficient amperage rating must be provided for laser printers.

6.7 Uninterruptible power sources

GE strongly recommends the use of an uninterruptible power source (UPS) on each of the system components requiring AC power. If a UPS is not used, improper shutdowns of the system are likely to occur in the event of a power outage and will cause a lengthy disk scan procedure when the unit reboots. An interruption in power also could result in data loss if a UPS is not used.

Healthcare Re-imagined

GE is dedicated to helping you transform healthcare delivery by driving critical breakthroughs in biology and technology. Our expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, and biopharmaceutical manufacturing technologies is enabling healthcare professionals around the world to discover new ways to predict, diagnose and treat disease earlier. We call this model of care "Early Health." The goal: to help clinicians detect disease earlier, access more information and intervene earlier with more targeted treatments, so they can help their patients live their lives to the fullest. Re-think, Re-discover, Re-invent, Re-imagine.

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US DOC1277106 2/13