

GE Healthcare

Project Implementation Guide

CARESCAPE Telemetry and Enterprise Access

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

To ensure the successful implementation of your new CARESCAPE™ system from GE Healthcare, this guide provides information needed to prepare for planning, installation, 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 GE CARESCAPE 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 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, reference other documents published by GE for product descriptions and clinical and technical information.

1.3 Product specifications

Please refer to product brochures and service manuals for detailed physical, electrical, and environmental specifications.

2.0 Implementation teams

2.1 Team roles and responsibilities

The success of a CARESCAPE 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 system implementation.

Guidelines for team members' roles and responsibilities are outlined below. Depending on the size and scope of 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 and disseminating any documentation that needs to be provided to the GE Project Team throughout project implementation.

Biomedical Director/Engineer–Represents customer medical equipment requirements, specifications, and standards. This person should be familiar with physiologic monitoring equipment, telemetry 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 the network standards and policies for the hospital.

Nursing Director/Manager–Represents the clinical aspects of the project, including system configuration, equipment placement, 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.

Lead Clinical Educator–Facilitates staff education process for each unit. Responsibilities include: selection of the Monitoring Resource Team; determination of class schedules; planning, pre-scheduling, and posting staff attendance; and gathering data and resources to configure monitor defaults. Role also includes verification of pre-training preparation for each participant.

Medical Director/Physician Representative–Assesses the need for physician training. Functions as a training resource and coordinates physician training.

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 (PM) or Account Coordination Specialist (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)-Coordinates and performs site survey, system installation, system testing, and 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.

Clinical Applications Specialist (CAS)-Collaborates with Lead Clinical Educator to develop a Training and/or GoLive schedule within the guidelines of the purchased training plan. Provides educational materials and training objectives as determined by the selected training program. CAS will provide education on the features and functionality of the monitoring equipment, explain defaults and monitoring configuration options to the appropriate Clinical Sub Team members, and support the staff during system 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.

2.2 Customer sub teams

Technical sub team

Depending on the size and scope of the project, the customer implementation team may require a separate team to review technical needs, provide expert recommendations and decisions, and coordinate technical tasks associated with the project. This Technical Sub Team typically includes representatives from Biomedical/Clinical Engineering, Information Technology, Facilities Management, and Telecommunications. The team will address specific technical tasks and considerations, such as cable installation, facility guidelines, code requirements, hospital network infrastructure, telecommunication equipment, remote connectivity, paging interface, carpentry, storage, and electrical requirements.

Clinical sub team

The customer implementation team also may choose to form a Clinical Sub Team to review monitoring needs and considerations, make decisions regarding alarm configuration and parameter defaults, define selection and evaluation process for system operators, and establish policies and procedures relating to the GE CARESCAPE system. Recommendations for membership and responsibilities of this Clinical Sub Team are described in Section 6.

3.0 Additional responsibilities

3.1 Customer responsibilities

The customer is responsible for performing the following tasks prior to and during the implementation of the GE CARESCAPE system. 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 assemble customer resources and requirements as needed throughout the implementation process, and who 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 the appropriate individuals to approve documents created throughout the project purchase. The customer is responsible for coordinating timely customer review of, response to, and approval of project documentation.

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 coverage and 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 all monitoring equipment and installation materials. The customer also is 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 or EA GE installed fiber option is not purchased, fiber installation, termination, and certification are the responsibility of the customer to follow the GE recommended specifications.

Carpentry and construction

The customer is responsible for any carpentry and/or construction work required for installation of the GE systems. Millwork required to house system components, installation of grommets and/or vertical wall channels, and any other construction required for the GE system will be the responsibility of the customer.

Electrical outlets

The customer is responsible for providing any additional electrical outlets required for the CARESCAPE system and networking components. All electrical supplies must 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 non-union 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.

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 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 Insite ExC digital services. Please refer to the product brochure for additional details.

WAN communication links

If applicable, the customer is responsible for the acquisition and configuration of all wide area network (WAN) communication links and associated routing equipment (e.g., ISDN, T1, T3, fiber, routers, DSU, etc.).

Uninterruptible power sources

Uninterruptible Power Sources (UPS) are required for all network and telemetry infrastructure 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 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 by the hospital, the customer is responsible for assigning permanent IP addresses for the CARESCAPE system.

Customer-supplied equipment

The customer is responsible for ensuring that 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. In addition, the customer must verify the on-site availability of supplies purchased from other vendors, such as invasive cables, batteries, temperature probes, recording paper, and other disposable products required for patient monitoring. The customer must proactively ensure the equipment and supplies purchased outside of GE meet applicable minimum specifications for use with the GE 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.

WMTS registration

It is the customer's responsibility to secure frequency coordination from the American Society for Healthcare Engineering (ASHE) before deploying WMTS equipment. Please refer to Public Notice DA 01-952 issued by the Federal Communications Commission dated April 17, 2001, for details. Information regarding WMTS registration can be found at the ASHE website.

Monitor configuration and default settings

It is the customer's responsibility to determine the system default settings, such as alarm limits, printing formats, etc. Final decisions must be made and provided to the CAS in advance of GoLive.

Training facility accommodations

The hospital will provide an adequate training room/facility that promotes an educational atmosphere. Space to accommodate tables, chairs, attendees, and monitors, as well as electrical outlets, shall be provided. GE will need to work closely with the hospital to identify a suitable training location, if there is an active WMTS telemetry system already running at the hospital. The training room will need to be located a sufficient distance from the live system in order to prevent RF interference that may affect system performance. If the training facility is located in a secured area, arrangements for access to elevators, hallways, and the classroom should be discussed prior to the training phase.

Staff training expectations

It is the hospital's responsibility to see that the appropriate nursing staff attends training as scheduled by the CAS and the hospital project manager or appointed contact. If there is low attendance or no one shows for the classes, more training time can be purchased and will be rescheduled based on CAS team availability.

3.2 GE responsibilities

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

Project management

GE will assign a Project Manager and/or Account Coordination Specialist to coordinate the planning, installation, and GoLive of the CARESCAPE Telemetry and/or Enterprise Access system. 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 facilitate with the customer to schedule GE resources for installation, testing, training, and GoLive. However, the customer is responsible for scheduling and managing hospital facility specific tasks required per project scope and timeline.

Hours of operation

The installation and upgrade will be performed during normal GE business hours of 8 a.m. to 5 p.m. local customer time Monday through Friday. If a customer wishes for the installation or upgrade to begin outside of those normal business hours, there will be additional fees associated with after-hours installation.

Installation of network

GE is responsible for system network design and distributed antenna system infrastructure. Depending on the networking purchased for the CARESCAPE Network, GE may be responsible for some or all of the following: system network design, supplying wired infrastructure parts, cable pulls, dust containment, termination, network installation, configuration, and certification of the network.

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 RF components

Depending on the level of service purchased, GE will install access points and/or antennas in the designated ceiling locations, per system design, and install other RF components in their respective closet locations. GE supplies all RF components per the sales contract signed with the customer.

Installation and configuration of telemetry system

GE will install, configure, test, and validate all GE telemetry system components, including central stations, strip recorders, and patient transmitters/transceivers. GE will input system default settings that are provided by the customer to the CAS.

System verification/commissioning

After system installation, GE will perform system verification/commissioning to confirm system operation and integrity prior to GoLive.

Training

GE provides clinical training on the GE CARESCAPE Telemetry system as stated in the sales agreement. The customer's equipment will typically be used for training.

GoLive support

The GE Field Engineer will be on-site as needed to support the system during GoLive. The GE Clinical Applications Specialist will be available on-site or via phone to provide support during GoLive according to the purchased training plan.

Site documentation

Depending on the networking level purchased, GE will provide as-built installation documentation to the customer following GoLive. This documentation contains all relevant installation information, such as access point and/or antenna layout, rack and wiring diagrams, and an interconnect matrix.

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

4.01 Pre-sale

The purpose of the pre-Sale and pre-Quote Phase is to educate the customer regarding product features, installation requirements, and customer responsibilities. GE and the customer work together to ensure compatibility of the existing/planned network, define the scope of GE ND&I consultation services, and determine the complement of equipment to be purchased from GE.

Task	Pre-sale		
	GE	Customer	Product
1 Distribute medical device sales brochures to customer	Sales		All
2 Distribute technology and service sales brochures to customer	Sales		All
3 Meet with customer to discuss responsibilities for equipment purchase, installation and service, and GE ND&I consultation services	Sales	PM, IT	All
4 Generate budgetary quote, if requested by customer	Sales		All

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	Product
1 Provide multiple sets of full-scale, hardcopy architectural drawings, as well as electronic (AutoCAD) drawings for all of the antenna coverage areas and equipment locations	Sales	PM	All
2 Obtain copy of sales order	PM/ACS		All
3 Provide customer contact information	Sales		All
4 Contact customer for introductory project discussion and to schedule Kick Off meeting	PM/ACS	PM	All
5 Estimate project timeline and resources	PM/ACS		All
6 Allocate resources and form implementation team	PM/ACS		All
7 Conduct call with GE implementation team to review sales order and high-level project scope	Core Team		All

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. Follow-up meetings or calls also will be scheduled at this time.

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

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

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

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

Education planning			
Task	GE	Customer	Product
1	Discuss and/or finalize system default settings	CAS	Lead Clinical Educator
2	Finalize class schedule and attendance	CAS	Lead Clinical Educator
3	Order training materials and supplies	CAS	CH, FH Tele
4	Confirm training equipment requirements	CAS	CH, FH Tele
5	Confirm availability of training rooms	CAS	Lead Clinical Educator
6	Set up training room	FE, CAS	CH, FH Tele

4.3 Executing

This phase includes system infrastructure installation, system installation and test, system training (if purchased), and GoLive readiness.

System infrastructure installation			
Task	GE	Customer	Product
1 Confirm receipt of infrastructure parts	FE, Contractors	PM	All
2 Provide install design documents to contractor ¹	FE, ND&I		All
3 Install, terminate cable, and complete test for system and remote connectivity ¹	FE, Contractors	Facilities, Contractor	All
4 Install antennas ¹	FE, Contractors		All
5 Install system infrastructure (i.e., servers, subsystems, switches, racks, splitter boards, EA equipment, UPS, router)	FE, Contractors	Facilities, Contractor	All
6 Install additional power outlets and/or telecommunications connections, if required		Facilities, Contractor	All
7 Confirm completion and approve cable test results	FE, PM/ACS	PM	All

¹System Infrastructure installation may either be the responsibility of GE or the customer. Please refer to sales agreement for appropriate terms and conditions.

System installation and test			
Task	GE	Customer	Product
1 Confirm on-site delivery of GE CARESCAPE equipment	FE, PM/ACS	PM	All
2 Verify on-site availability of customer-supplied equipment provided by other vendors, if applicable	PM/ACS	PM	CH, FH Tele
3 Perform physical inventory	FE, Contractors		All
4 Perform system infrastructure commissioning	FE, ND&I		All
5 Install central stations and peripheral devices ¹	FE, Contractors		CH, FH Tele
6 Configure telemetry system ¹	FE, CAS		CH, FH Tele
7 Program patient transmitters/transceivers	FE		CH, FH Tele
8 Perform system installation test procedure ²	FE		CH, FH Tele
9 Complete incoming inspection and asset tagging		Biomed	All

¹If this system is replacing an existing, live telemetry monitoring system, installation of central stations and/or peripheral devices may be scheduled to occur during GoLive Phase to avoid disruption in patient monitoring.

²Replacement of an existing, live WMTS system with a different WMTS system will require special coordination during testing and GoLive, due to likely RF interference between systems.

System training (if applicable)			
Task	GE	Customer	Product
1 Distribute training agenda outlining class objectives	CAS		CH, FH Tele
2 Provide training literature to the class attendees (i.e., Quick Reference Guide, Operators Manual)	CAS		CH, FH Tele
3 Conduct training and ensure adherence to class size guidelines to best meet training objectives	CAS		CH, FH Tele
4 Conduct course evaluation	CAS	Lead Clinical Educator, staff	CH, FH Tele
5 Award CEU certificates if criteria is met and doing so is applicable to state guidelines	CAS		CH, FH Tele
6 Complete training report/post training summary	CAS		CH, FH Tele

GoLive readiness			
Task	GE	Customer	Product
1 Conduct pre-GoLive status call to confirm completion of required customer site preparation activities, make go/no-go decision regarding start of GE on-site installation activities and finalize GoLive plan including a review of system downtime	Core Team	Core Team	All

4.4 Monitoring and controlling

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

System GoLive			
Task	GE	Customer	Product
1 Install CIC equipment and distribute transmitters	FE		CH, FH Tele
1 System GoLive	Core Team	Core Team	All
2 GoLive Support, if purchased	CAS		CH, FH Tele

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 detailed plan for ongoing customer support.

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

5.0 Technical requirements

The GE CARESCAPE system 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.

5.1 Space and access

Adequate space and access is required for a successful GE CARESCAPE system implementation. Therefore, it is the hospital's responsibility to provide locations for monitoring equipment and network infrastructure that meet the design requirements as coordinated with GE. Members of the GE Core Team working on-site must have access to those locations at appropriate points throughout the implementation process.

5.2 Network infrastructure

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.

5.3 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.

5.4 Cable requirements

Listed below are the requirements pertaining to the installation of Category 5, coaxial, and fiber-optic cables:

- Category 5 cable runs shall be dedicated to the GE system network infrastructure and shall only be routed through patch, interconnect, or cross-connect panels provided for the exclusive use of the GE network infrastructure.
- Use of existing Category 5 cable runs is prohibited unless they have been reviewed, tested, certified, and approved by GE.
- Cables shall be labeled per the interconnect matrix in the GE design package.
- Category 5 cables terminated in wiring closets or to equipment racks shall only be punched down into GE specified punch panels.
- Punch-down panels shall be labeled per the summary sheet of the interconnect matrix in the GE design package.
- Category 5 cable runs to workstation locations shall be terminated with industry-standard RJ-45 wall jacks supplied by the cable contractor.
- Fiber-optic cable cross-connects shall be minimized.
- Use of pre-existing fiber-optic cable runs is prohibited unless each fiber-optic run has been reviewed, tested, certified, and approved by GE.
- Fiber-optic cables shall be labeled per the interconnect matrix in the GE design package.
- Fiber-optic cables shall be terminated to industry-standard interconnect panels or trays provided by the cabling contractor.
- Fiber-optic interconnect panels shall use type SC connectors, unless approved in advance by the GE

Network, Design and Implementation Engineer.

- Enterprise Access fiber requirements are SC/APC fusion spliced connections. Refer to the Contractor Design Package for exact cabling specifications.
- The total end-to-end optical loss must be < 3dB at 1310nm, back reflection <-45dB at 1310nm. Enterprise Access ½" coaxial cable must be tested to the specifications provided.

5.5 Remote connectivity (InSite ExC and/or VPN)

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 GE-supplied router 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.

5.6 Central monitor room

When multiple central stations are located in a Central Monitor Room, they require adequate cooling and ventilation based on total heat dissipation of the CPUs, as well as any laser printers and other peripheral equipment. In addition, there must be a minimum distance of 24 inches from the wall to the rear of the monitoring system for service and installation.

5.7 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.

5.8 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.

5.9 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.

5.10 Laser printers

Depending on the type of equipment purchased, network laser printers may be installed as part of the monitoring system. Please refer to product documentation for specific setup procedures and supported printer models.

Note: Do not connect a laser printer to the same electrical outlet or UPS that is used for any other monitoring system components. A separate AC power outlet with sufficient amperage must be provided.

6.0 Clinical applications

The involvement and support from the clinical administration and staff are vital to the success of the GE system implementation. It is essential for clinical administration to manage the change process and facilitate open communication with affected staff. GE recommends that customers create an Implementation Sub Team to focus on specific monitoring and/or ventilation needs and considerations. This section defines staff requirements and outlines GE training guidelines.

6.1 Clinical sub team

Depending on the size and scope of the project, the implementation team may choose to form a Clinical Monitoring Sub Team. This team will work one on one with the GE Clinical Applications Specialist to review your institution's monitoring needs and to meet the specific considerations and/or concerns of each monitored unit.

GE will look to the Sub Team to provide monitoring recommendations and decisions, such as selection and evaluation of the Clinical Resource Team Members, and to establish policies and procedures relating to the GE CARESCAPE system.

Members of this committee should include:

- **Nursing Director/Manager**–The chairperson of this committee, who is also the representative to the GE Project Team.
- **Nursing Unit Manager(s)**–Includes all managers of nursing units who will be using the GE monitoring system.
- **Nursing Educator(s)**–Assist with planning and participate in the training sessions. Provide support during the GoLive. Assume responsibility for support and education of staff following the implementation.
- **System Operator Representative**–Supervisor or assigned staff member to provide input into operational issues and assist with adoption of system capabilities into the care setting.

Communication updates should be scheduled on a routine basis. Frequency of meetings should be based on the following:

- Amount of time required by the committee to establish policies, procedures, and standards of care
- Completion of pre-requisite education, as required
- Hiring and training of staff

Our Clinical Applications Specialist (CAS) will work closely with your staff to identify and accomplish key implementation milestones. Action items should be highlighted with target completion dates as defined. Clinical Monitoring Sub Team members will work with the CAS during the Education Planning, Monitoring Training, and System GoLive and Support phases of the project.

6.2 Clinical staff definitions

GE has created a training program designed to meet the dynamic needs of your staff. Depending on the education program you have selected, our CAS staff will assist you with establishing a comprehensive training program and will provide support during the GoLive Phase.

Staff requirements

Our on-site training program identifies two types of users: The Basic User and the Clinical Resource User.

Basic user-A Basic User utilizes the GE monitoring system for accessing patient information. This would include nurses, physicians, and support staff using monitoring information via the bedside monitoring device or the central station. The basic user shall have the following knowledge:

- Skin Preparation and Lead Placement-including deployment of different lead configurations
- Arrhythmia Recognition
- Ability to perform basic monitor functions, including admission, discharge, transfer, alarm and parameter management, event history, and troubleshooting.
- Clinical skills and procedures when applying the monitor features in accordance with hospital policies and standards

Clinical resource user-In an effort to maximize unit resources and independence, GE strongly suggests that customers establish a Monitoring Resource Team comprised of Clinical Resource Users for each unit and shift. The Monitoring Resource Team may include nurse manager(s), educator(s), and two or three representatives who will be using the GE CARESCAPE system.

The Monitoring Resource Team will assist during the GoLive Phase and be a post-installation resource to hospital personnel. The GE Clinical Applications Specialist will work with this group to provide training information and clinical support. During the Training Phase, we strongly encourage Monitoring Resource Team members to attend at least two training classes in order to familiarize themselves with detailed equipment operation. In addition, we recommend that these individuals be scheduled to work during the GoLive Phase for their unit. A GE Clinical Applications Specialist will be working side by side with the Monitoring Resource staff during the GoLive Phase.

The following attributes can be used to assist with the selection process of these key leaders:

- Demonstrated ability to function as a liaison between the clinical and medical staff
- Strong clinical knowledge and skills with the ability to apply the monitor features and functionality in accordance with hospital policies and standards
- Acknowledged by peers as someone with strong interpersonal and technical skills
- Possesses the ability to learn new technology and assist others with the same
- Provides, when needed, appropriate training, support, resources, and encouragement during the implementation process
- Views learning opportunities as a welcomed challenge; recognizes and rewards others' endeavors throughout the process
- Assesses baseline knowledge and monitors performance improvement activities

6.3 Creation, approval and education of the policies and procedures

Another critical success factor for implementation is the creation, approval and education of specific policies and procedures associated with the monitoring system. These policies and procedures should include information such as system operator and caregiver protocols, suggested alarm default settings, and guidelines for skin preparation and lead placement.

We recommend consideration of the following when developing the standards and protocols:

- Acuity, diagnosis, or care level of the patients monitored
- Patient placement and transfer
- Communications issues
- Equipment use

6.4 Clinical training guidelines

The GE Clinical Applications Specialist will work closely with your Lead Clinical Educator and make every attempt to meet your scheduling needs for education based on the following guidelines for minimum class durations:

- Basic Bedside/CIC-Noninvasive: 2 hours
- Basic Bedside/CIC-Full Hemodynamics: 2 hours
- Telemetry/CIC: 1 hour
- Rover/Combo: 1/2 hour
- Super User-Solar/Dash/Bx50 (or basic bedside): 4 hours
- Super User-Telemetry: 2 hours
- Additional Modules: 1/2 hour each
- Class size not to exceed 10 participants per class (ideally 6 to 8 participants).
- Classes are to be held in a dedicated class/conference room in a mutually agreed-upon location. The GE Field Engineer is responsible for physical setup of the training equipment.
- The CAS will ship educational materials to the hospital based on the number of attendees provided by the Lead Clinical Educator.
- Total class time is not to exceed eight hours per day.
- Classes will begin no earlier than 2 p.m. on Monday and will end by 12 p.m. on Friday. The Lead Clinical Educator has ownership of class participation and ensuring attendance is met according to schedule.
- Allow a minimum one-hour-long meal break for lunch and/or dinner, if classes are being conducted during an eight-hour block of time.
- Allow a minimum of 10 hours between the end of the last class during evening/night shift and the beginning of the first class the next morning. Night shift classes (between the hours of 11 p.m. and 7 a.m.) and weekend coverage must be discussed and negotiated before the classes begin.
- GoLive support is a 12-hour day. Formal, scheduled classes are not offered on GoLive day(s) due to CAS involvement with GoLive support activities. CAS support is provided via a combination of on-site, on-call, and GE Customer Support Center coverage. One CAS will provide GoLive support, unless a second CAS has been negotiated as part of the purchase.
- The customer is responsible for verifying the on-site availability of any monitoring components supplied by other vendors (e.g., invasive cables, batteries, temperature probes, recording paper, or other disposable products) that are required for patient monitoring.
- If hospital policies and procedures are being added or changed and this information is to be presented during staff training, the Lead Clinical Educator must provide this information to the CAS in advance of the first class.
- The Clinical Online/Onsite Education Database Service (COEDs) will be used by both the hospital and the CAS for sign-up, sign-in, obtaining class rosters, completing evaluations, and receiving CEUs.
- Remote education offerings (Web-based, CD, video, and telephone support) also are available from GE. Please discuss these offerings with your local sales representative during the order process.

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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 DOC1277117 2/13