Data Management

Imaging Solutions' Medical Data Management system is designed to help healthcare providers manage and store medical imaging data securely and efficiently. Our system allows for the storage, retrieval, and sharing of medical imaging data, providing healthcare professionals with quick and easy access to patient information when they need it.

your single source supplier™

IMAGING Solutions

IMAGING Solutions

Trusted provider to medical imaging professionals since 2000

Imaging Solutions is celebrating over 25 years as a trusted provider of market-leading medical imaging equipment and accessories. With an unwavering commitment to innovation, quality, and service, we continue to deliver cutting-edge solutions that empower healthcare professionals worldwide.

25 years

your single source supplier ™

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Regulatory Notice

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Laurel Bridge

Enterprise medical imaging software solutions

For decades, Laurel Bridge industry-favorite solutions have enabled hospitals and healthcare organizations to automate and integrate clinical workflows to provide clinical staff with high availability of medical images when and where they are needed. Laurel Bridge modular solutions seamlessly integrate to solve a wide range of complex workflow challenges, such as: enterprise-wide study ingestion, department or clinical IT system consolidation, distributed sub-specialty reading, archive consolidation, automated prior exam delivery and cross-organization modality sharing.

Imaging Workflow Solutions	 **Navigator™**	 **Compass™**	 **Waypoint™**
	Orchestrate availability of prior medical imaging studies, automating retrieval and sharing across unlimited sources and destinations, efficiently and effortlessly.	Automate the ingestion and distribution of medical imaging information among heterogeneous clinical imaging systems.	Facilitate the integration of an enterprise's information and imaging systems to enhance routing and image fetching.
	 **Beacon™**	 **Lighthouse™**	
	Centralize and simplify the on-demand Q/C management of DICOM study metadata in the age of enterprise imaging and deconstructed PACS.	Centralize monitoring and diagnosis of installed imaging workflow components by aggregating information across your enterprise infrastructure.	
Migration and Consolidation Solutions	 **Exodus™**		
	Assess, plan, execute and monitor DICOM archive migration with powerful, automated functionality and a flexible, user-friendly interface.		
Developer Solutions	 **DCF™**	 **PowerTools™**	
	Create robust, DICOM-enabled applications quickly and efficiently. Speed your path from design to development to release, with our industry-best SDK.	Integrated set of low-level DICOM and HL7 software utilities and management tools. Analyze, test and troubleshoot any imaging workflow challenges.	

Compass™

Robust gateway interface engine for routing, replicating, monitoring and altering DICOM store jobs.

Routing Workflow Manager

Compass automates the ingestion and distribution of, as well as the tracking and access to, medical imaging studies among disparate clinical and enterprise imaging IT systems. Regardless of the size or complexity of the organization, it can ensure that new studies are delivered to the right radiologist or clinical specialist, at the right time, irrespective of the number of locations. **Compass** can also provide an EMR a unified list of all instances of a patients' imaging studies and trigger Navigator to ensure that the correct prior imaging studies are available, even if they reside on multiple facilities PACS or VNA systems.

Enterprise Imaging Capabilities

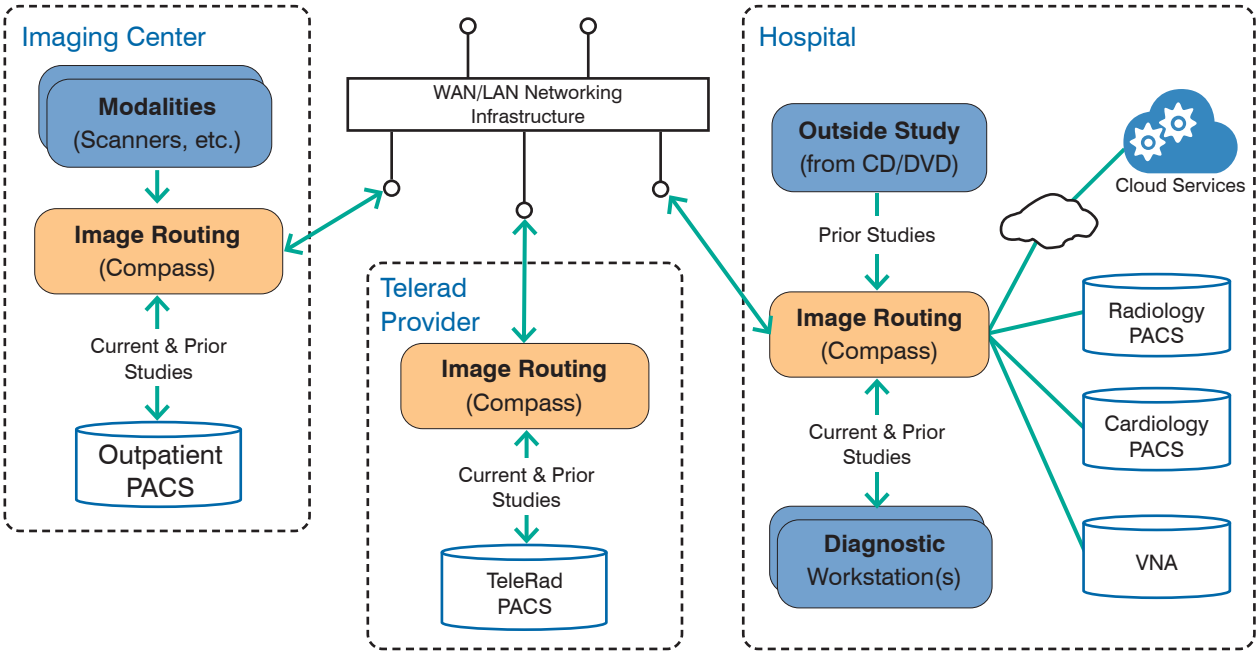
We strive to help merged and acquired organizations solve their unique enterprise imaging challenges, such as the need to ensure visibility and access to all of a patient's relevant medical images regardless of where they reside. **Compass** enables healthcare providers to easily implement and manage a scalable imaging workflow layer that enhances the interoperability between multiple PACS, VNA, and clinical IT environments to ensure they effectively communicate with each other.

Benefits

The ability of **Compass** to act as a gateway to ensure that medical imaging studies are properly identified and associated with the correct patient, originating location and study description enables:

- Creation of site - specific workflows that depend upon the interoperability of otherwise incompatible modalities, systems and workflows that span technology domains.
- Automated distribution of DICOM and non-DICOM imaging studies and HL7 files to multiple reading and archiving locations.
- Improved radiology department productivity and clinical report accuracy by automatically including DICOM SR measurement data in the radiologists report.
- Time of day, sub-specialty and location specific teleradiology workflow.

Solve these examples and many other image storage workflows with Compass:



Minimum System Requirements

	HL7	Direct	Store	Pro
Windows OS (standard/server) 10; 2012	Yes	Yes	Yes	Yes
MS-SQL server version + Management Studio	Express	Express	Express	Express
Memory (RAM)	16 GB	16 GB	16 GB	16 GB
Processor	i5	i5	i7	i7
Hard Drive	500 GB	250 GB	500 GB	500 GB
# of network (NIC) cards (Gigabit)	1	1	1	1
Supports high-availability configurations	Yes	Yes	Yes	Yes

Compass™ Features

Compass is a fast and flexible DICOM router and replicator for DICOM C-Store requests. With **Compass**, modalities easily store to multiple destinations without the hassle of repeated resends. Flexible mapping rules and simplified configuration mean modalities can store and route directly via **Compass**, with a wide variety of rules including day of week and time of day, making **Compass** the most powerful DICOM router on the market today.

Enterprise scalability meets the needs of the largest integrated health systems.

Compass is built upon a modularly scalable architecture that can serve the high throughput and sophisticated workflow needs of the largest integrated healthcare networks. Capabilities include query spanning with filtering, HL7 message routing, non-DICOM file transport, support for all DICOM message types, load balancing, and DICOM Structured Report (SR) data extraction.

Imagine the impact on your workflow if you could:

- Route, Replicate, Monitor, Schedule & Alter DICOM Store Jobs or HL7 messages
- Manage unlimited sources & destinations
- Identify and/or retrieve all exams for a given patient from multiple, disparate archives with a single request
- Facilitate the interconnection of incompatible devices using tag morphing filters
- Route or multiplex DICOM store jobs based on any DICOM tag
- Use HIPAA compliant, secure, encrypted communication
- Integrate events and actions with HL7 communications
- Drag-and-drop study import & route capability using “hot-folders”
- Parse DICOM Structured Reports and route DICOM data to integrated dictation and transcription systems like Nuance PowerScribe® 360 and M*Modal Fluency™ «read more»

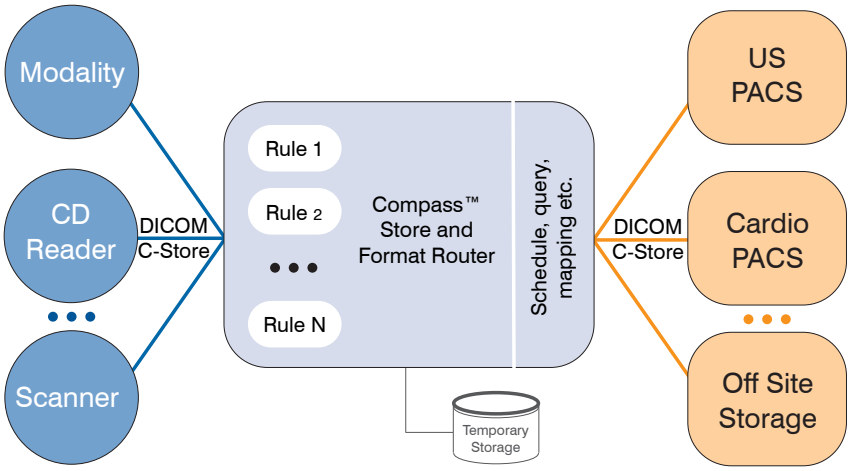
Structured Reporting and Dictation System Integration

The new dictation integration option for Compass automates the insertion of quantitative measurement data, from a modality, into the radiologist’s report or dictation template. See Enhancing PowerScribe® 360 Reporting Workflow for additional information regarding this option for Powerscribe.

This improves radiology staff productivity and enables the radiologist to focus on dictating their report. Clinical quality can also be enhanced because automation ensures the right information is accurately incorporated into the clinical report. Compass DICOM structured report (SR) data management becomes an extension of the tag morphing/coercion capability of our Compass Routing Workflow Manager, which enables solving of complex imaging workflow challenges that benefit from the combined capabilities.

The Compass PowerScribe 360 Integration Module uses the PowerScribe 360 Web Services API to map DICOM SR data fields into the PowerScribe 360 report template. Post-processing can be performed to modify, add, or remove PowerScribe 360 custom fields. The flexibility and configurability of Compass also provides support for custom or private DICOM SR formats and fields, including the following exam types:

- OB-GYN
- Vascular (Doppler Carotid, Renal, Abdomen)
- Thyroid
- Testiclular



Compass™ Capabilities Matrix

Compass Versions:	Direct	Store & Forward	Professional
Descriptions:	DICOM Message Router	DICOM Image Router	All Core Features
Maximum # of Compass sources & destinations	Unlimited	Unlimited	Unlimited
Number of failover Compass destinations		Unlimited	Unlimited
Number of Compass routing rules	Unlimited	Unlimited	Unlimited
DICOM DIMSE Store & Forward routing (DIMSE = traditional DICOM C-Store)	$	✓	✓
DICOM DIMSE Direct routing (all traditional DicoM DIMSE message types)	✓	$	✓
DICOMweb Store & Forward + protocol translation: DIMSE <-> DICOMweb	$	$	✓
DICOMweb Direct routing + protocol translation: DIMSE <-> DICOMweb	$	$	✓
Queryable internal study cache (max 300K instances, temporary storage)	$	$	✓
Queryable internal study cache (max 1M instances, temporary storage)	$	$	$
Secure transport (TLS 1.0, 1.1., 1.2)	✓	✓	✓
Windows service for automatic start on boot	✓	✓	✓
Web access	✓	✓	✓
Trigger fetching of prior exams	✓	✓	✓
Compression (transfer syntax) conversion	✓	✓	✓
DICOM image routing priority	✓	✓	✓
Destination availability monitoring & heartbeat sensing	✓	✓	✓
Tag-morphing and filtering	✓	✓	✓
Study anonymization (includes pixel overlay capability)	✓	✓	✓
Load balancing—DICOM-aware, may use study identifier	✓	✓	✓
Multiplexed storage destinations		✓	✓
Hold queue - for manual review & routing		✓	✓
Automatic Order Generation (AOG) - from in-bound exam		✓	✓
Federated Query/Query Spanning without filtering	✓		✓
Federated Query/Query Spanning with filtering	$		$
HL7 routing (Note: A standalone Compass HL7 version is available for HL7 routing only.)	$	$	$
Non-DICOM file secure transport between Compass instances	$	$	$

Integrations & Customizations:			
Analytics integration		$	$
Dose monitoring integration		$	$
AI workflow and cloud delivery integration		$	$
Navigator™ Imaging Retrieval Workflow Manager, relevant priors fetching	$	$	$
Waypoint™ - Encounter & Modality Worklist Manager		$	$
Beacon™Enterprise Study Q/C Manager		$	$
Lighthouse.™ - Centralized Monitoring & Management	$	$	$
Customizations - specialized filters, job actions, queries, lookups, mappings, etc.	$	$	$
Custom file-type translations - example: convert HL7 reports to other formats		$	$

Compass High-Availability Config Options

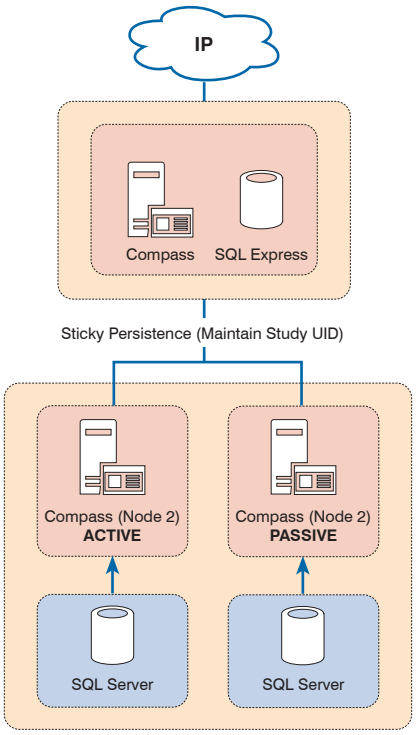
1. Customer supplied load balancer (such as an F5) with a Compass active and Compass passive router.

In this configuration, the customer supplied load balancer will monitor the active Compass by sending a ping to the configured DICOM port. If there is no response the load balancer will start sending studies to the passive Compass. This configuration usually does not share a database or disk storage so any in-process jobs on the router that stopped responding will need to be resent unless you are only using direct routes. This configuration can be setup as active/active as well. You can also add additional routers for additional throughput. There is no DICOM sticky persistence.

When updating Compass, the passive node can be upgraded, brought online with minimal downtime while upgrading the active node.

This will require 2 x Compass standard licenses.

Scenario 1



2. Compass direct load balancer with a Compass active and Compass passive router

This configuration consists of a Compass direct load balancer that will relay incoming DICOM connections to an additional Compass active router. If the active router does not respond then it will failover to the passive router. As in option 1, this configuration usually does not share a database or disk storage so any in-process jobs on the router that stopped responding will need to be resent unless you are only using direct routes. This configuration can be setup as active/active as well. You can also add additional routers for additional throughput. This configuration supports DICOM sticky persistence.

When updating Compass, the passive node can be upgraded, brought online with minimal downtime while upgrading the active node.

This will require 3 x Compass standard licenses.

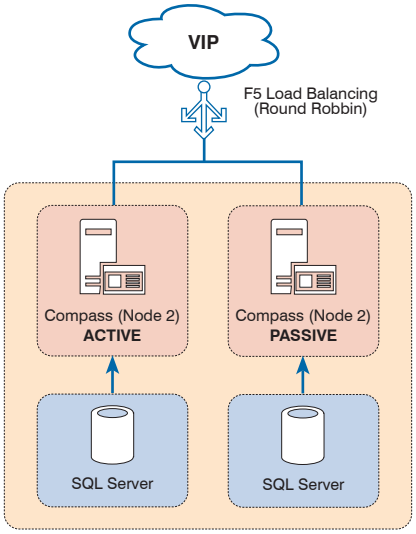
3. Windows Server Failover Cluster as a Service (WSFC)

This configuration consists of two or more Windows servers setup as a WSFC with a Compass active and one or more Compass passive routers. WSFC monitors the health of the Windows server and Compass service and automatically fails over to a passive node if there is an issue. This configuration can include a clustered shared volume for image data and a high availability SQL server that is shared between the nodes. If configured with these features the routed studies will be available even after failover. You can also setup the cluster with independent nodes that do not share data so any in-process jobs on the router that stopped responding will need to be resent unless you are only using direct routes in this configuration.

When updating Compass, the passive nodes can be upgraded, brought online with minimal downtime while upgrading the active node.

This will require 2 x Compass standard licenses.

Scenario 2



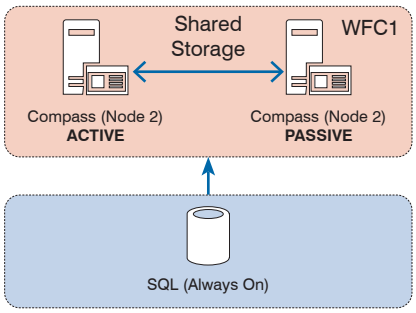
4. Window Server Failover Cluster with Hyper-V VM

In this configuration, a single active Compass router is installed on a Hyper-V VM which can be moved between one or more nodes of a WSFC. If there is an issue with the active server node the VM will be moved to a different node in the cluster. The VM can be hosted on an HA clustered shared volume. This does not protect an installation if there is a Compass configuration error on the VM as there is a single instance of the router.

Scheduled downtime would be required to upgrade the Compass VM

This will require 1 x Compass standard license.

Scenario 3



5. VMWare VMotion

In this configuration, a single active Compass router is installed on a VMWare VM which can be moved between one or more servers. These servers can be in disparate locations. This does not protect an installation if there is a Compass configuration error on the VM as there is a single instance of the router.

Scheduled downtime would be required to upgrade the Compass VM

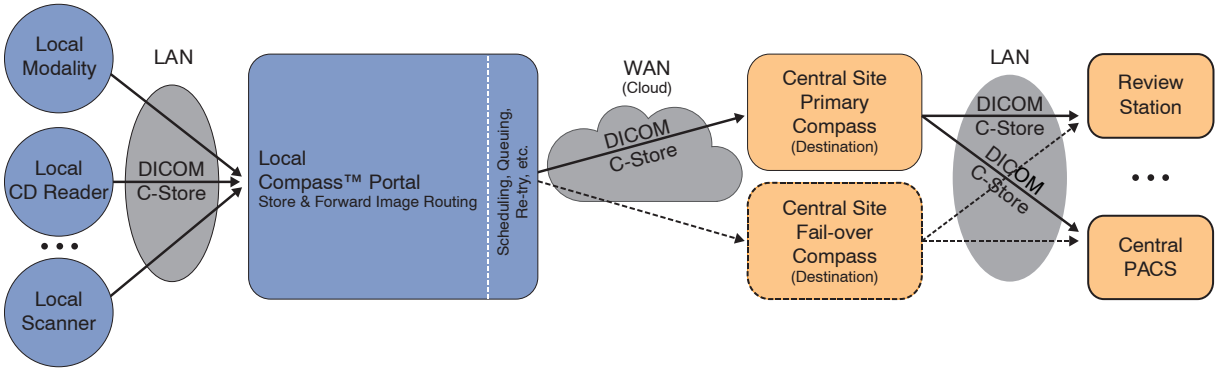
This will require 1 x Compass standard license.

Compass™ Portal

Reliable Image Transport to a Central Site

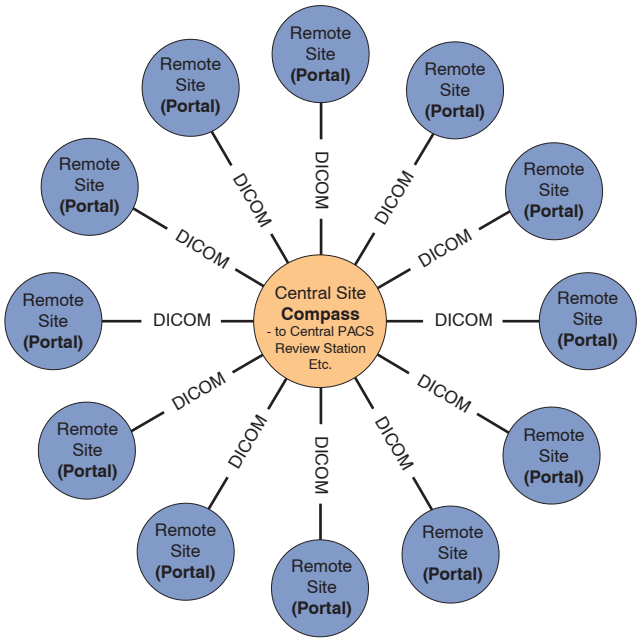
- Simple, pre-configured Windows™ service for easy deployment
- Reliably receive, route, & deliver medical images (DICOM Store Jobs)
- Supports unlimited sources in a promiscuous mode – no AE-Titles to configure
- Pre-set & pre-configured primary and failover destinations
- Rapidly off-load studies from local modalities
- Automated retry for any failed data transfers
- Automated resumption of an interrupted DICOM transfer, no need to start over
- Automated failover should primary destination become unavailable
- Automated Heartbeat Sensing to detect restored destination services
- Centrally manage all tag-morphing, filtering, & routing on the central Compass
- Secure, encrypted communication using TLS/SSL for HIPAA compliance
- Access & view the local Portal job table via a password-protected web page
- Access & view all received jobs at the central Compass console or web-page

Efficiently manage deliver & ingestion of medical images



Typical Usage Scenarios:

- **Spoke and Hub configuration**
  Ease delivery & control of incoming imaging studies from remote sites
- **Central Checkpoint**
  Identify studies by their source site Normalize data fields Assign consistent values Distribute studies to review stations Control which studies enter your PACS



Compass™ Performance Testing

Compass Performance Summary

System: 10 Gbps virtual network
Compass 2.4.7 on: VM Server 2012, 2.60 GHz CPU, 8 cores, 32 GB RAM, 3 TB SSD
Other server apps on: VM Windows 7, 64-bit, 2.60 GHz CPU, 8 cores, 8 GB RAM, 128 GB HD
32 Study Generators sending continuously w/no delays (8 servers running 4 SCUs each)
16 Store Servers (SCPs): 4 servers running 4 each
4 HL7 Senders & Receivers per system
Average of multiple 60-minute runs

Test: Nov. 21, 2017

Max Throughput – DICOM only

How fast can data be pushed through Compass?

Compass Config	Study Profile	Data Rate GB/hr	Data Rate Gbps	Studies/hr	Images/hr
Store & fwd, load bal.	US: 40 x 90 KB	72	0.160	20,972	838,880
	Mammo: 4 x 40 MB	391	0.869	2,499	9,996
	CT: 100 x 515 KB	330	0.733	6,725	672,500
Direct, load bal.	US: 40 x 90 KB	131	0.291	38,070	1,522,800
	Mammo: 4 x 40 MB	2,118	4.707	13,552	54,208
	CT: 100 x 515 KB	758	1.684	15,443	1,544,300

Throughput Observed with HL7 Overhead Added

How much overhead does HL7 traffic to Compass introduce when added to the scenarios above?

Compass Config	Study Profile	HL7 msgs/hr	Observed Gbps	Studie /hr	Overhead Percent
Store & fwd, load bal.	US: 40 x 90 KB	0	0.16	20,972	
		1,024	0.158	20,687	1.36%
		14,400	0.156	20,401	2.72%
	Mammo: 4 x 40 MB	0	0.869	2,499	
		1,024	0.851	2,452	1.88%
		14,400	0.829	2,387	4.48%
	CT: 100 x 515 KB	0	0.733	6,725	
		1,024	0.72	6,603	1.81%
		14,400	0.702	6,440	4.24%
Direct, load bal.	US: 40 x 90 KB	0	0.291	38,070	
		1,024	0.289	37,831	0.63%
		14,400	0.287	37,563	1.33%
	Mammo: 4 x 40 MB	0	4.707	13,552	
		1,024	4.647	13,381	1.26%
		14,400	4.569	13,156	2.92%
	CT: 100 x 515 KB	0	1.684	15,443	
		1,024	1.676	15,360	0.54%
		14,400	1.644	15,057	2.50%

Transcoding Performance

What is the impact of transcoding on the CPU & memory usage for the system and application?
For CT testing below, the study generators were configured to achieve a load of ~34,000 CT images per hour.

Transcode mode: JPEG .90 to ELE									**System**		**App**	**Send Delay**
Description					**Input Data Rates**				**CPU**	**Mem**	**Mem**	**Introduced**
SCUs Gens	**SCPs Srvrs**	**Study Profile**	**Compass Routing Mode**	**Duration of test**	**Imgs/ hr**	**Input GB/hr**	**Input Gbps**		**Avg Pct.**	**Avg Pct.**	**Avg MB**	**secs/img**
8	16	CT: 100 x 515 KB	Direct (load bal), pass-thru	0:15:00	34,528	18.21	0.04		1.20%	8%	139	0.675
8	16	CT: 100 x 515 KB	Direct (load bal), transcode	0:15:00	34,327	18.1	0.04		14.30%	8%	155	0.54
8	16	CT: 100 x 515 KB	Store & Forward, pass-thru	0:15:00	34,522	18.21	0.04		1.60%	8%	108	0.66
8	16	CT: 100 x 515 KB	Store & Forward, transcode	0:15:00	34,678	18.29	0.041		7.50%	8%	123	0.66

Compass™ Throughput Optimization Protocol Service (TOPS)

Performance Metrics

The “TOPS”, or Throughput Optimization Protocol is a proprietary protocol used to transfer jobs to another instance of Compass version 2.1.0 or greater. TOPS provides throughput enhancements for jobs with many instances as well as enhanced job restart capability in the event of an error mid-transfer (such as a temporary network failure).

Internal Benchmark Testing

Internal testing on a LAN with the introduction of artificial round trip times revealed that Compass-to-Compass transmissions with TOPS enabled is capable of achieving greater than 11x improvement in performance over standard DICOM transmissions.

Independent Benchmark Testing

Independent testing by an existing Compass customer on a production environment WAN across country boundaries using a variety of study types revealed 2.39 to 12.16x improvement in performance by Compass/TOPS over standard DICOM transmissions.

Compass TOPS+ - Preliminary Performance Evaluation

Systems
Windows 7 Pro x64 sending to Windows XP SP3

WAN Emulation
Linktropy 7500 PRO FW: 4.3.2

Bandwidth
20Mbps

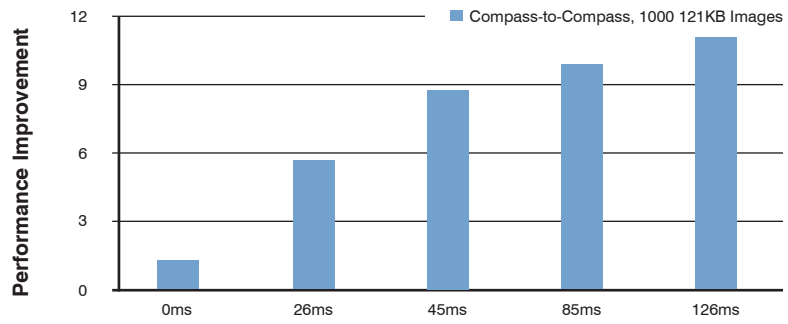
Delay

- 25ms (Newark, DE -> Philadelphia, PA)
- 50ms (Newark, DE -> Austin, TX)
- 100ms (Newark, DE -> Vancouver, BC)
- 200ms (ie. Newark, DE -> Japan)

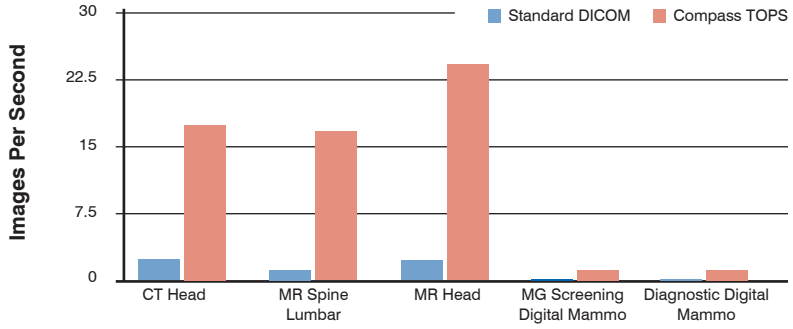
No random loss, background traffic, reordering, or packet duplication

Values presented are the mean of 4 sample transfers

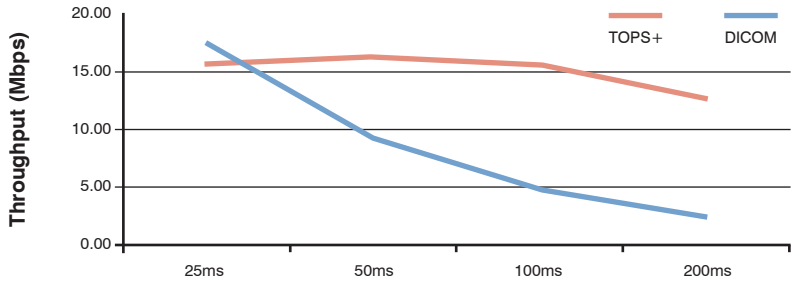
Round-trip Communication Delay



Images Per Second

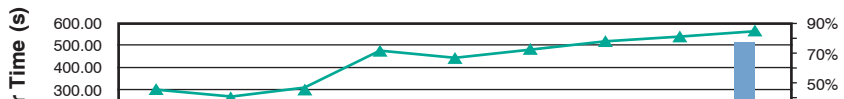


DICOM/TOPS+ Throughput vs Latency



TOPS+ throughput sustained with increasing latency

Compass to Compass: DICOM vs TOPS+ with Latency



	50ms			100ms			200ms		
	30.6 MB	54.9 MB	152.6 MB	30.6 MB	54.9 MB	152.6 MB	30.6 MB	54.9 MB	152.6 MB
DICOM	27.79	47.03	129.18	53.20	93.02	254.55	106.02	183.30	505.50
TOPS+	15.20	28.22	70.25	15.41	31.22	70.78	23.91	35.28	79.33
%Speedup	45%	40%	46%	71%	66%	72%	77%	81%	84%

TOPS+ overcomes latency issues on WANs

Navigator™

Enterprise functionality meets the needs of the largest integrated health systems.

Navigator ensures relevant historical medical imaging studies and reports are made available to the radiologist for image comparison purposes and for providing greater clinical context, thereby enhancing the diagnostic process.

Common use cases include:

- Automate and prioritize retrieval of relevant prior studies, based upon user-defined criteria, even when the desired information resides on disparate clinical or enterprise imaging archives or VNAs.
- Handle new, walk-in, or unscheduled imaging studies or reports. When these scheduling events occur, Navigator can be triggered by the Compass image router to ensure that the relevant prior imaging studies are retrieved and made available to the radiologist, even when they reside on multiple, disparate PACS archives or VNA systems.
- Include retrieved historical study information as part of an archive migration-on-demand process, whereby the pre-fetching process also consolidates DICOM and non-DICOM imaging information on a VNA or another centralized archive system.

Enterprise Imaging Capabilities

As the need to access historical medical information increases across the healthcare enterprise, we strive to help our customers meet their evolving enterprise imaging needs. By leveraging the workflow capabilities of our full product line, the distributed organizations that result from mergers and acquisitions can more easily solve their unique imaging integration challenges.

Our capabilities enable healthcare providers to easily implement and manage a scalable workflow layer that enhances interoperability between multiple PACS, VNA, and clinical IT environments.

Other Benefits that Navigator Enables

- Support the demands of unscheduled ED, stroke, and trauma imaging, as well as long-lead-time, pre-scheduled imaging studies (such as breast, lung, and oncology follow-up) by prioritizing and scheduling retrieval of historical imaging studies.
- Retrieve historical clinical reports or other related files associated with the historical DICOM imaging studies.
- Schedule prefetching when no RIS or other ordering or scheduling system is available.
- Support complex imaging scenarios, such as when a patient might have multiple exams scheduled for the same day.
- Simplify monitoring of workflow and system activity across multiple facilities.

Navigator automates the retrieval and movement of existing DICOM and non-DICOM information stored on any archive used across a hospital or healthcare system. This includes looking across the healthcare organization to query multiple archives simultaneously.

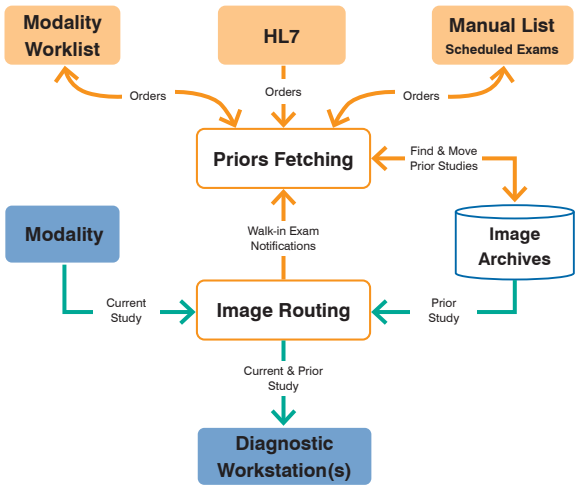
Enterprise functionality meets the needs of the largest integrated health systems.

The emergence of integrated health systems and clinical integrated networks continues to increase imaging service line complexity even as imaging is used in a wider range of care areas. Such organizations require a powerful and flexible clinical IT infrastructure that supports their continually evolving requirements for image access and availability.

Increasingly, a patient's historical imaging studies and reports reside in multiple, disparate locations, using different data identification schemes. Navigator has the intelligence to automate even the most complex priors fetching scenarios that are typical of large, integrated health systems. Navigator works in concert with our Compass Routing Workflow Manager to manage and coordinate a range of enterprise image ingestion and workflow needs.

Imagine the impact on your workflow if you could:

- Retrieve an HL7 object (report) while retrieving its associated DICOM imaging study.
- Prioritize image fetching rules with user defined criteria.
- Leverage site-specific pre-fetch workflow criteria to meet an organization's unique clinical and operational priorities, such as:
  - » Status (e.g., STAT, Walk-in)
  - » Department (e.g., ED, ICU, Stroke)
  - » Study or procedure type (e.g., Trauma, Stroke)
  - » Date of next scheduled exam
  - » Location (e.g., originating site or destination)
  - » Modality
  - » Time-of-day
- Trigger the retrieval of historical priors from a batch import list of scheduled patients, in addition to the triggers available for HL7, web calls, or DICOM MWL.



IMAGING Solutions

Lighthouse™

Centralized Monitoring & Management Platform

Seamlessly Manage Your Laurel Bridge Infrastructure

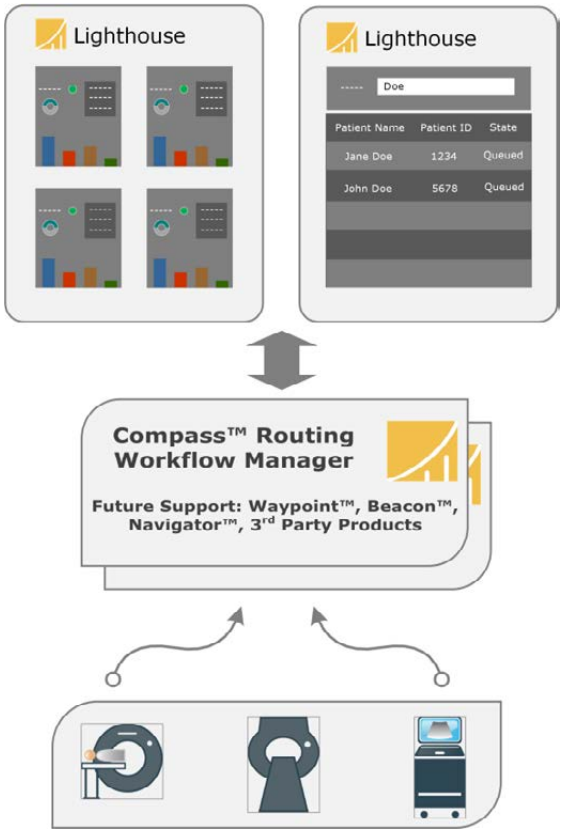
The Lighthouse Centralized Monitoring and Management package allows for seamless monitoring and diagnosis of your installed imaging workflow components. It aggregates information across many application instances, providing a collective view of the state of your configured infrastructure. Lighthouse allows for quickly finding and diagnosing troublesome jobs among a wide install base of workflow components.

Monitoring and Management Capabilities

- Manage and view multiple Laurel Bridge components via an easy-to-use web interface
- Monitor and track activities and services across many Laurel Bridge instances, including active connections, I/O stats, job reports, and alerts
- Search for patients and related information across all monitored devices
- View aggregated job and patient information based on various query criteria
- Start/stop input and output processing in connected LBS applications via a single dashboard
- Jump to a specific Laurel Bridge node to further diagnose issues
- Allow for role-based web access
- Provide HIPAA compliant, secure, encrypted communication, and audit logging

Future Capabilities

- Integration with additional Laurel Bridge products:
  - ✓ Navigator™
  - ✓ Waypoint™
  - ✓ Beacon™
  - ✓ Exodus™
- Integration with other accessible 3rd party imaging workflow applications
- Visualization of imaging workflow analytics data



Diagnostic Capabilities

From a single console Lighthouse enables you to manage your installed Compass™ applications.

- Easily recognize and access failed jobs across your install base
- Reprioritize, delay, or redirect jobs with ease
- Analyze DICOM header information
- View images with a non-diagnostic viewer
- Gain insight into each device's DICOM association and HL7 connection history
- Examine HL7 message contents
- Search for patients or studies across all monitored devices

To Complete Your Imaging Workflow Solution:

Integrate Lighthouse with your deployed Laurel Bridge applications to provide easy centralized access to consolidated workflow data and to accelerate diagnosis of imaging workflow issues.

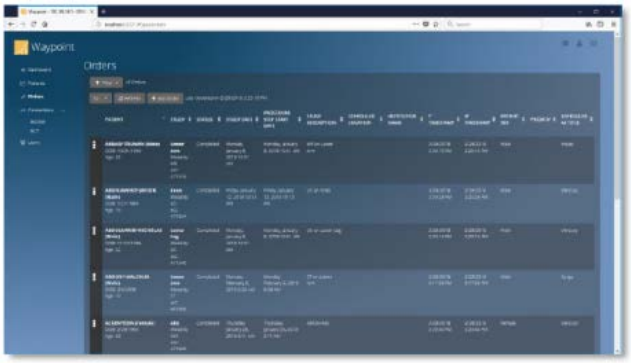
An enterprise Compass user and early adopter of Lighthouse enthusiastically reported, "Lighthouse is a game changer!"

Waypoint™

Encounter & Modality Worklist Manager

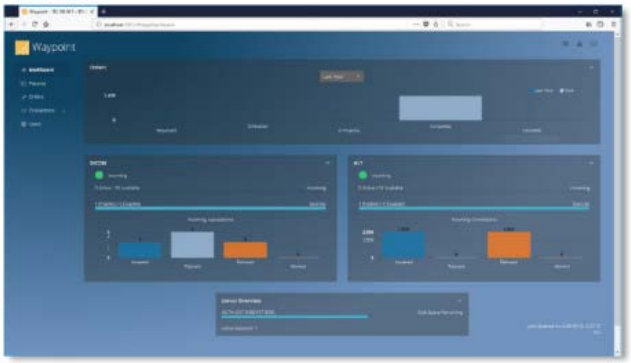
Waypoint consolidates and centrally manages multiple, existing modality worklists and HL7 exam order feeds from any number of Hospital and Radiology Information Systems into a single enterprise modality worklist. As a result, Waypoint can automate the assignment of patient demographics for a number of medical imaging workflows, such as point-of-care (POC) ultrasound.

Waypoint enhances the capabilities of our existing enterprise image routing and relevant prior exam fetching workflow solutions within our Enterprise Imaging Workflow Suite. It provides patient demographic information on demand to modalities and other imaging applications, eliminating manual order data entry and thereby enhancing clinical data integrity.



Enterprise Workflow Benefits

- **Waypoint** enables women's imaging facilities to improve clinical quality and staff productivity by ensuring relevant prior studies are available to the radiologist prior to patient arrival, even when exams are scheduled 12-24 months in advance.
- **Waypoint** ensures images acquired at the point-of-care are automatically and accurately associated with the correct patient record by applying the demographic information from the scheduled encounter found in **Waypoint**.
- **Waypoint** helps maintain the integrity of the PACS database by providing correct, order-based demographic data to acquisition devices.

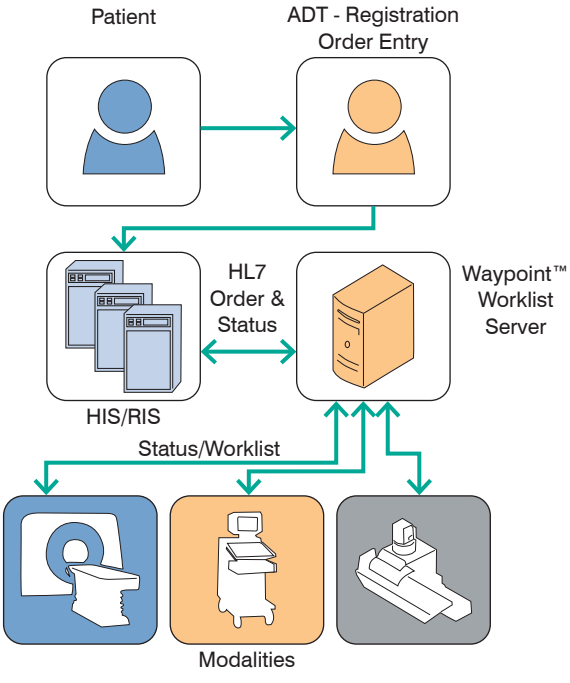


Enterprise Imaging Capabilities

- Receives and tracks from multiple sources (HIS/RIS/PACS)
  - » DICOM, HL7, and DICOMweb orders
  - » encounters and appointments
  - » any schedule updates or order status changes
- Implements workflow management services using standards-based communication
  - » DICOM Modality Worklist (MWL)
  - » Modality Performed Procedure Step (MPPS)
  - » Universal Procedure Step (UPS)
- Supports stand-alone deployment or integration with
  - » the Laurel Bridge Compass router,
  - » the Laurel Bridge Navigator prior exam fetching solution, or
  - » other imaging workflow applications.

Waypoint improves your workflow with many supported features:

- Web-based, distributed access to orders and Waypoint status and management information
- All DICOM worklist-related management classes: MWL, MPPS, and UPS
- Standard HL7 message types: ADT, ORM, ORU
- User-configurable custom mappings of order information (HL7 or DICOM) to DICOM MWL tags
- Runs as a Windows service with a Windows administrative console and a web user interface
- Unlimited order feeds (internal or external, HL7 messages, or other DICOM worklists)
- Unlimited modalities may query
- Waypoint Manual order entry/creation is available for emergency and other unscheduled exams
- Manual disposition of worklist entries: add, modify, remove, mark as performed
- Robust logging support and capabilities, including HIPAA-compliant audit logging
- History of all messages associated with an order is maintained
- Secure networking protocols
- HIPAA compliant
- Supports high-availability configurations: physical or virtual



IMAGING Solutions

Beacon™

Enterprise Study Q/C Manager

Beacon centralizes and simplifies the on-demand Q/C management of DICOM study and patient data prior to its delivery to configured destinations, such as a PACS or VNA. Beacon is a component of the Laurel Bridge Enterprise Imaging Workflow Suite that enhances existing enterprise medical imaging workflow orchestration capabilities.

Key Capabilities

- Centralizes the identification and correction of DICOM metadata issues during study import and acquisition, as well as on legacy data that exist in a PACS or VNA.
- Facilitates quality management of DICOM study metadata from disparate clinical IT systems.
- Correct study and patient demographic data that was incorrectly entered.

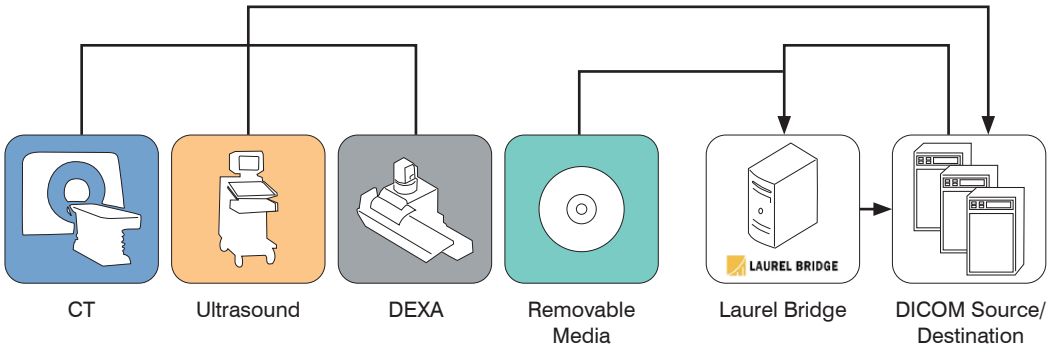
Beacon enables healthcare and teleradiology providers to manually correct and improve the quality of DICOM study and patient metadata during acquisition, import from CD or ingestion from a legacy archive.

Features

The Beacon Study and Patient Demographic Q/C Manager includes the following capabilities:

- **Manually verify, and if necessary correct, DICOM patient and study meta-data.**
- **Send verified or corrected DICOM objects to a specific DICOM destination, including the Laurel Bridge Compass Router for further sharing across the enterprise.**
- **View the DICOM pixel data using a non-diagnostic image viewer.**
- **Supports Local/LDAP login.**

Beacon Workflow



DICOM ROUTING SOLUTIONS

Exodus™

Migration & Consolidation Controller

Exodus is a powerful data orchestration tool that can enable your organization to solve a variety of archive migration and consolidation challenges that may result from product lifecycle management or mergers and acquisitions.

Exodus works with other Laurel Bridge software applications to empower your health system to strategically manage your own migration and consolidation efforts and allows you the option to bring the necessary expertise in-house. This enables your organization to have ongoing control and management of legacy archives, which is vital to ensuring that clinical staff has access to historical medical images.

We provide the flexibility you need to meet your organization's evolving enterprise imaging workflow needs and the unique challenges that exist due to supporting disparate IT systems. Implement the migration approach that meets your unique needs:

- Self-conducted through your internal expertise.
- Service provider managed through our expertise.

Pair the Exodus Migration Controller with our Compass DICOM Router to:

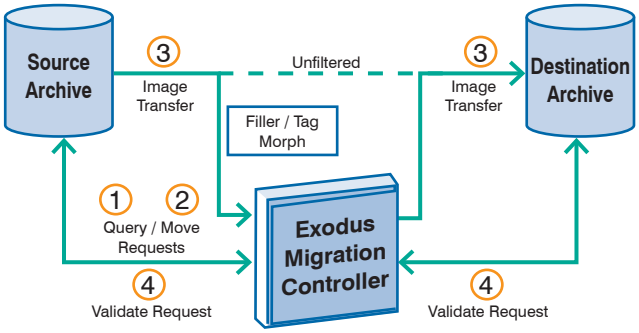
- Temporarily store the migrated data before sending to final migration destination (often referred to as a "forklift" migration).
- Multiplex the migrated studies to more than one destination.
- Generate an out-bound HL7 ORM order message to the destination archive before sending the migrated studies.
- Load-balance the C-Move Requests to multiple AE titles on the source archive (may improve the rate at which source archive can deliver exams)
- Load-balance the C-Store to multiple ingestion nodes/ports on the destination archive (may improve rate at which destination archive can ingest/store migrated exams)

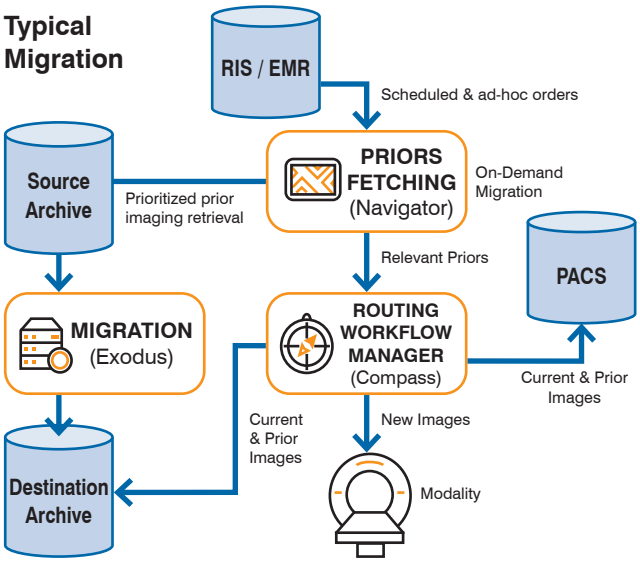
Pair the Exodus Migration Controller with our Navigator Prior Fetching Solution to:

- Fetch and migrate prior exams for scheduled patients, from multiple archives (not just from the primary archive that you are migrating) while also performing a full migration from a single primary source.
- Incorporate a Master Patient Index (MPI) or PIX query into your prior exam fetching process to allow updating of the patient demographics as part of the migration process.

Which of these migration challenges can Exodus solve for you?

- Merger of two or more archives
- Access to relevant priors
- Mismatched patient/study information
- Archive vendor proprietary issues
- Private DICOM tag handling
- Non-compliant/inconsistent DICOM data
- Unknown size of the job
- Uncertainty of completeness
- Inability to validate the data moved
- Excessive manual effort
- Inability to pre-fetch relevant priors





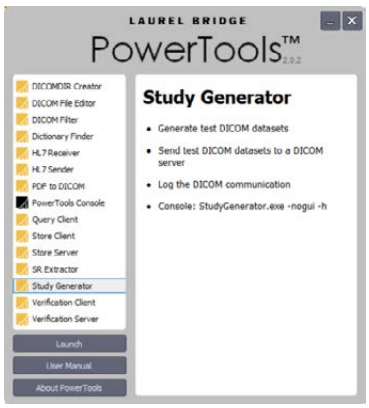
The Exodus Migration and Consolidation Controller can support various migration methodologies. Each has unique benefits that are intended to take advantage of the information available and the capabilities of the existing archives:

	Traditional DICOM	Source of Truth	File Import	On-demand
Source of information: (about files to be migrated)	DICOM query response from legacy archive	Client supplied list	Legacy archive file system	Modality worklist of scheduled patients
Benefits:	• Uses DICOM to identify and track progress • Includes latest database data	Based on a pre-defined list	Enables migration of older archives that don't support DICOM Query/ Retrieve	Ensures prior data is available when needed
Limitations:	• Speed • System performance • Single source	• List requires compilation • Static • Single source	• Includes all files, including undesired files • Single source	Limited to a single source, except when paired with Navigator

PowerTools™

PowerTools is a suite of DICOM and HL7 tools designed for the development, testing, troubleshooting, or debugging of applications that use DICOM and HL7 communications. With PowerTools, you can view, repair, or create DICOM data sets and support, manage and diagnose medical imaging communications.

Add PowerTools to your toolbox



- Edit DICOM files
- Generate studies
- Create DICOMDIRs
- Store Client & Server
- Verification Tools
- Modality Worklist Tools
- DICOM to PDF
- HL7 Sender & Receiver
- Much more…

Do you need to manipulate DICOM files?

- View, edit, or print the contents of a DICOM dataset (file)
- Apply filters to a DICOM file or collection of DICOM files
- De-identify (anonymize) a DICOM file to remove PHI
- Create a sample DICOM file in a particular transfer syntax
- Convert a DICOM dataset to a new transfer syntax
- Convert a DICOM image to another image format: JPEG, PNG, BMP, GIF, TIFF…
- Convert a PDF file to a DICOM encapsulated PDF file
- Diagnose problems with a DICOM dataset
- Extract DICOM SR tags for use in dictation reporting templates
- Lookup tag, element, and UID values in a DICOM dictionary
- Create an index for a collection of DICOM datasets

Do you need to manage DICOM communications?

- C-Store a DICOM dataset to a DICOM store server
- Log the DICOM communication between a client and server
- Stress-test a DICOM store server by sending it auto-generated study data
- Query a PACS for particular DICOM data or query a worklist server for today's scheduled patients
- Send a DICOM C-Move request or DICOM Verification (Echo/Ping) message
- Run a DICOM client or server (echo, store, query, MWL, etc.) to test your own application or device for connectivity or functionality

Do you need to send or receive HL7 messages?

- Produce, send, and receive HL7 messages (v2.x)
- Log HL7 communication
- Send or receive HL7 ACKs

PowerTools tackles just about any DICOM challenge

PACS administrators, integration engineers, system testers, software developers, field service technicians, and many others who work with DICOM and HL7 rely on PowerTools. The suite includes GUI and console versions that can run stand-alone or scripted to support your development, management and problem-solving needs.

PowerTools tackles just about any DICOM challenge

The standalone PowerTools programs fill a wide variety of needs and functionality, suitable for DICOM PACS administrators and software developers. The PowerTools suite includes easy-to-use DICOM server (SCP) and client (SCU) applications for DICOM communications, and applications for viewing, changing, creating, converting, or fixing DICOM data sets, working with HL7 communications and generating integrated dictation and translation system mapping files that integrate seamlessly with Compass. Most applications come in GUI and console versions, so the PowerTools utilities run independently or scripted in a variety of development and troubleshooting scenarios.

System Requirements

- Microsoft .NET Framework 4.7.2 or newer (installed by PowerTools installer)
- Runs on just about any system that supports the minimum OS requirements, with performance varying based on the specific tools and the size and complexity of datasets used. Windows 10 is recommended.
- Console applications are scriptable
- GUI and console applications provide standard -h command line usage messages

What do you get?

PowerTools includes a comprehensive and continuously improved suite of tools:

	DICOM Utilities
DICOM File Editor	• View, edit, modify the contents of a DICOM dataset or image file • Visualize the patient, study, series & instance hierarchy • Drag-and-drop loading of instances and directories • Built-in DICOM image viewer for testing and development • Export image and header data to JPEG, PNG, BMP, GIF, TIFF, Animated GIF, plain text and more • Perform tag morphing, applying filters to a dataset • Switch between normal and hexadecimal view of file contents • Search dataset contents using simple and wildcard queries • Synchronize viewing of header tags between datasets
DICOMDIR Creator	• Create DICOM media from a directory of DICOM datasets on disk
DICOM Filter	• Create, store and retrieve complex user-defined filters for modifying DICOM datasets • Apply filters to one or more datasets in an automated way • Anonymize DICOM datasets, series or studies • Apply pixel blanking or blinding to anonymize PHI burned into images
Dictionary Finder	• Look up information from the DICOM data dictionary • See values and meanings for tags, elements and UIDs
Study Generator	• Automatically generate studies • Direct studies to the console, file system or DICOM store server, including a configurable delay between each store • Customize generated images with study information, desired file size, background image and burned-in overlay • Generate any number of studies, series and images, using a single or multiple associations, sequentially or in parallel • Create and store any number of store server profiles for flexible and efficient testing
PDF To DICOM	• Select one or more PDF files and customize header data using a configurable template • Store as DICOM encapsulated PDF datasets to the file system or DICOM store server
DICOM Indexer	• Categorize your repository of test data • Create a spreadsheet of DICOM assets organized by selected DICOM elements in a directory hierarchy
Structured Report Extractor	• Extract tag data from DICOM Structured Reports • Generate dictation system template mapping files • View and verify extracted data • Confirm mapping names and units • Summarize Auto Text data • Supports Compass job actions and more
App Launcher	• Convenient application for selecting and launching PowerTools GUI utilities
	DICOM Clients and Servers
Modality Worklist Client and Server	• Connect to a modality worklist SCP • Provide a modality worklist SCP for a directory on disk
Query Client and Server	• Query a query SCP (or PACS) for DICOM images, and move DICOM images from the server to another location • Provide a query SCP for a directory on disk
Store Client and Server	• C-Store DICOM images from disk to a store SCP • Receive C-Store DICOM images from a store SCU
Verification Client and Server	• Send C-Echo requests as a Verification SCU • Receive and reply to C-Echo requests as a Verification SCP
	HL7 Client and Server
HL7 Sender	• Produce and send HL7 messages using configurable templates • Log HL7 communication traffic • Wait for ACKs • Communicate via SSL • Apply mapping rules to generate dynamic content in messages with customized values
HL7 Receiver	• Receive and display HL7 messages • Log HL7 communication traffic • Send ACKs and simulate communication delays • Communicate via SSL

Datamed - EKG Format Translators

Datamed® software provides a bridge between ECG acquisition devices and ECG management/storage systems that are not normally compatible. This allows medical facilities the freedom to choose the devices and systems that best meet their needs rather than being locked in by native compatibility.

DatamedFT™

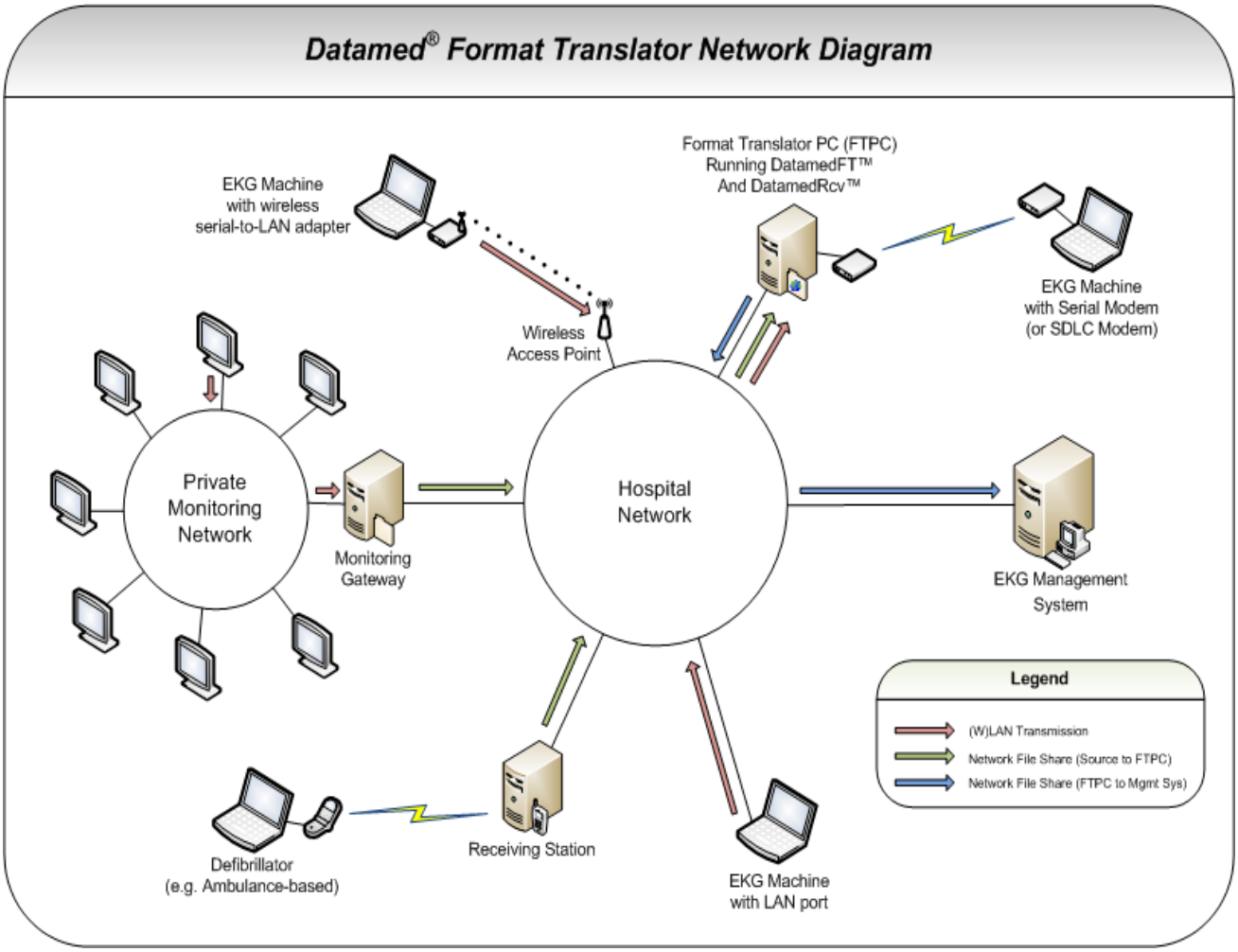
DatamedFT™ converts the ECG data from the format of one manufacturer to the format of another, so that medical facilities can purchase the most appropriate cardiographs, monitors, and ECG management systems from differing manufacturers. DatamedFT™ allows for purchasing flexibility and extended equipment life.

DatamedFT ™ is a highly specialized software application that may be installed on the ECG Management system's host server, a monitoring gateway, an enterprise application server, or a stand alone PC ("FTPC"). and connected to the source and destination device via network.

DatamedFT™ receives ECG data from the source ECG machine, bedside monitor, or other acquisition device as data files in that device's native data format. This file-based application combined with our optional DatamedSnd™ Transmitter Modules and DatamedRcv™ Receiver Modules can transmit and receive the ECG Data files over LAN, WAN, serial, or modem connections.

Each ECG file contains the waveform data along with patient demographics, measurements, and analysis statements. As the file is translated from the source format to the target host's native format, many fields can be manipulated using optional settings and advanced field mapping. The resulting file is then sent to the ECG Management System. Translated ECGs are seen and handled by the host system as if they had originated on their own proprietary devices, and may be stored, recalled, edited, viewed in a serial presentation, and printed just as any other ECGs in the host system.

Source devices and management/storage systems from over twenty different manufacturers are supported, and new formats are added on an ongoing basis. For customers who have a variety of cardiographs and other acquisition devices, DatamedFT™ can be configured to handle any number of available source formats on a single computer.



DatamedWL™

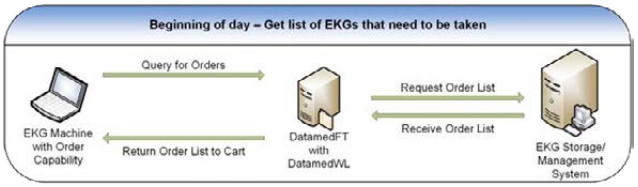
Adding cross-vendor compatibility to a single-vendor solution.

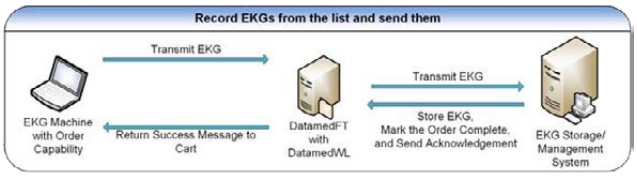
DatamedWL™ combined with the DatamedFT™ format translator this product gives customers the ability to query for orders, record the ECGs, and then send them to the management/storage system to close out the orders. This fully integrated workflow is an important part of a single-vendor solution, but cross-vendor compatibility has been very limited. Now workflow integration doesn't mean being locked out of equipment choices. This will further enhance sales opportunities for our vendor partners.

Installed with DatamedFT™, the software runs as a service level application and may be installed on the ECG Management System's host server, an enterprise application server, or a standalone computer/virtual machine. The manner of installation, method of connection, and exact configuration largely depend on the vendor and the preference of the customer's IT staff. DatamedWL™ runs without interaction and is a completely transparent interface. For customers who have a variety of cardiographs and other acquisition devices, DatamedWL™ and DatamedFT™ can be configured to handle any number of compatible source formats on a single computer.

This product is a two-way system that acts as the native management system for the source devices, and as a native source device for the management systems. Each side of the communications utilizes an interactive communication. In some cases (including DICOM® hosts) context items will be cached locally so that they can be used when interacting with the host, even though the actual source device does not support the data. This results in tremendous capability for future interfaces.

This product is a two-way system that acts as the native management system for the source devices, and as a native source device for the management systems. Each side of the communications utilizes an interactive communication. In some cases (including DICOM® hosts) context items will be cached locally so that they can be used when interacting with the host, even though the actual source device does not support the data. This results in tremendous capability for future interfaces.





DatamedRcv™ ECG Receiver Modules

DatamedRcv™ ECG Receiver Modules provide protocol-specific acquisition mechanisms for devices that may not have another means of transferring ECGs. A Receiver Module runs as a system service and monitors incoming network (or serial) connections. ECG files are written to a folder where the DatamedFT™ service will pick them up for processing. Depending on the source device and transmission method, additional hardware and/or setup may be necessary.

DatamedRcv™ Module DRCV01

For GE® / Marquette® cardiographs and ZOLL® defibrillators

DatamedRcv™ Module DRCV01 is a Receiver Module runs as a system service and will monitor one or more serial ports and/or a TCP/IP port for connections from cardiographs and monitors that transmit using the CSI protocol. These devices typically either do not have an alternative method for transmitting the ECGs or it is difficult to accomplish. Once an ECG transmission is received, a file is written which the DatamedFT™ service will translate to the appropriate destination format.

DatamedRcv™ Module DRCV02

For Philips® PageWriter® Touch/Trim/TC cardiographs & IntelliVue® monitors

DatamedRcv™ Module DRCV02 runs as a dedicated TCP/IP listener service and will monitor a TCP/IP port for incoming connections from Philips® PageWriter® Touch, PageWriter® Trim and PageWriter® TC cardiographs, as well as Philips®IntelliVue® monitors when using the new PIIC iX. Once an ECG transmission is received by the receiver service, a file is written which the DatamedRcv™ service will translate to the appropriate destination format. DatamedRcv™ Module DRCV02 can handle incoming requests from multiple supported devices simultaneously to simplify and expand reception.

DatamedRcv™ Module DRCV05

DatamedRcv™ Module DRCV05 listens on a TCP/IP network port for an incoming connection, then receives the data and writes it to a file. There is no upper-level protocol or handshaking, just a simple network transmission. Configuration options will specify the IP address and port, the folder to write files to, and a file extension.

DatamedSnd™ Module DSND01

For DICOM® files written by DatamedFT™ into a DICOM® PACS or storage system.

DatamedSnd™ ECG Transmitter Modules provide protocol-specific transmission mechanisms for host systems that may not be able to pick up the converted ECG files from a folder. A Transmitter Module runs as a system service that monitors a folder for converted files and sends the files using the appropriate protocol.

It monitors a folder for .dcm files and sends the files using the DICOM® transmission protocol to a DICOM® PACS or other DICOM® based storage system. This transmitter module is NOT used if DatamedWL™ is installed, and is only needed if the PACS /storage system does not have the capability to load .dcm files directly.

IMAGING Solutions

Explore Our Range

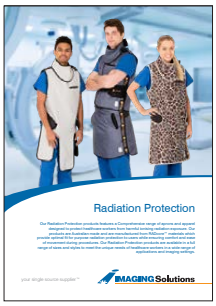
At Imaging Solutions, we take pride in offering an extensive and comprehensive range of products designed to cater to the diverse needs of healthcare facilities across the globe. Our commitment to providing top-quality equipment and technology solutions is at the core of our Preferred Supplier Agreement. This ensures that our customers receive unparalleled access to the best in class products, while benefiting from the tangible value we deliver through managing and containing operational costs. With a broad spectrum of offerings, our Single Source Supply agreements are the ideal solution for meeting your facility's specific needs.

As your trusted partner, Imaging Solutions is dedicated to providing a seamless and integrated experience, allowing you to focus on delivering exceptional patient care. With our Preferred Supplier Agreement, you can have confidence that you are investing in the most advanced and reliable products in the industry, all while enjoying the cost-saving benefits that our Single Source Supply agreements provide. Explore Our Range and discover the Imaging Solutions difference.

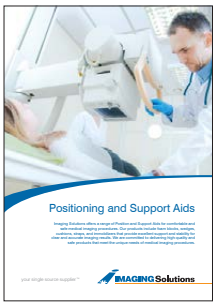
Your Single Source Supplier™

Established initially as a small medical imaging hardcopy film and consumables distributor, specialising in analogue based imaging technology, the company very quickly identified the need for a reliably supply source of high quality imaging accessories. As a result the business targeted a small niche of premium suppliers of imaging accessories and over a short space of time acquired distribution access these to develop an initial foundation for todays expansive and comprehensive accessories portfolio. These industry wide market leading brands converge together to develop a comprehensive product portfolio offering the company markets today.

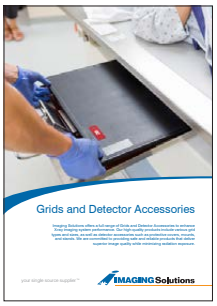
Effectively on completion of our initial growth phase, in building the accessories range offering, Imaging Solution set about the task of identifying the worlds market leading brand, in every functional specialisation existing in the imaging market.



Radiation Protection



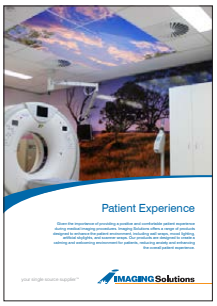
Positioning and Support Aids



Grids and Detector Accessories

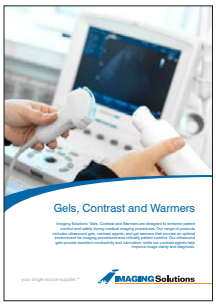
MRI Equipment and Accessories

Design and Construction

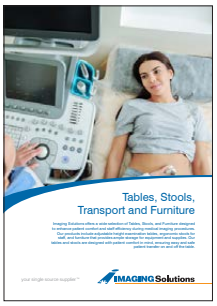


Patient Experience

Imaging Markers and Procedure Accessories

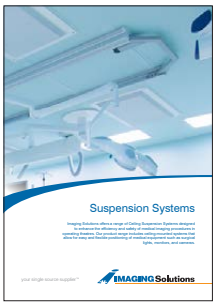


Gels, Contrast and Warmers

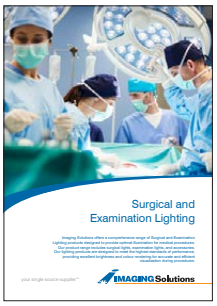


Tables, Stools, Transport and Furniture

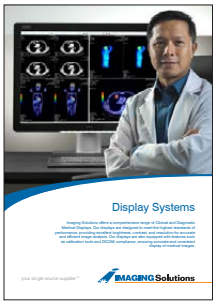
Trolleys, Stands, Carts and Storage



Suspension Systems

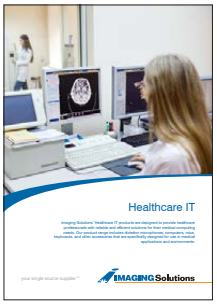


Surgical and Examination Lighting

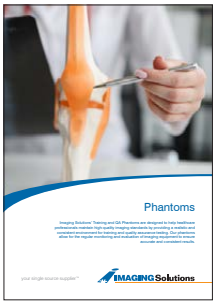


Display Systems

Data Management



Healthcare IT



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