

datafirst™



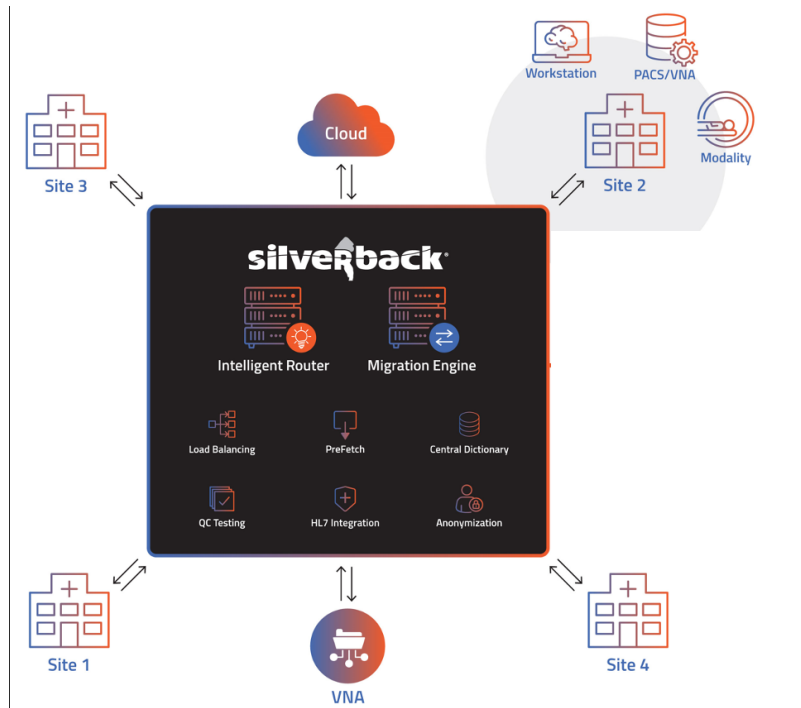
## ENTERPRISE IMAGING INTEROPERABILITY: WHY IT'S TIME TO REPLACE YOUR DICOM ROUTER



silverback®

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## ABOUT

DataFirst was founded in 1990 by healthcare specialists and military veterans. Today, the company's healthcare information technology solutions have earned acclaim for solving some of the most complex imaging data and interoperability challenges in the healthcare industry.

With the award-winning Silverback® enterprise-grade workflow engine, DataFirst leads the effort to enable seamless interoperability across the healthcare enterprise. Offering tools to enhance workflows, distribute images, migrate study data, and power intelligent decision-making, Silverback® empowers providers to take control of their imaging networks and connect their operations using the industry's most powerful platform. Using artificial intelligence, Silverback® delivers smart and timely quality checks and predictive reporting so organizations can mitigate risks and disruptions.

## INTRODUCTION

DataFirst's experience and expertise in image interoperability has developed over the last three decades. The company's drive to solve challenges with intelligent imaging software has allowed healthcare providers to improve care delivery. Each day, new real-world cases highlight the practical advantages of the Silverback® platform as enterprises continue to suffer from a mix of organization-specific and industry-wide challenges.

Recently, DataFirst's Chief Executive Officer, Beau Jones, hosted a virtual event titled, "Enterprise Imaging Interoperability: Why It's Time To Replace Your DICOM Router." The interactive, hour-long webinar highlighted how DataFirst has developed cutting-edge tools for the imaging market- place to help solve interoperability challenges across the healthcare industry. Beau was joined by DataFirst's Chief Operating Officer, Bob Maskulyak, and Head of Research and Development, Brad Kueter, for the discussion. The session focused on image interoperability in today's healthcare environments, introduced them to DataFirst's dynamic, real-world solution through different case studies, and answered attendees' questions about specific use cases and sophisticated tools. This e-book summarizes some of those cases.

# INTRODUCTION TO IMAGING INTEROPERABILITY

Enterprise imaging interoperability is a familiar topic to many in healthcare. Today's healthcare environments have become increasingly complex as clinicians demand new ways to consolidate clinical information and imaging systems. Fortunately, new technologies and architectures are beginning to solve challenges and meet the needs of today's environments by effectively streamlining workflows.

With cloud-based services and artificial intelligence, providers can meet the requirements of speed, security, and performance to deliver real-time patient care.

While hundreds of articles have documented the ongoing struggle to attain interoperability, few have detailed any comprehensive and sophisticated solutions in the marketplace. Chris Roth, the Director of Imaging Information Technology Strategy at Duke Healthcare, spoke directly to this point in his Harvard Business Review article earlier this year, saying, "Healthcare experts recognize the importance of imaging integration but don't have the background or experience to make that happen."

This is particularly true for integrated health systems that want to proactively detect and alert to problems and solve them in sophisticated, intelligent ways. For example, the basic router employed in many healthcare enterprises is technically outmatched and unable to meet the environmental demands and challenges of modern data imaging.

For 30 years, DataFirst has been on the frontlines leading hundreds of projects annually in different healthcare environments and interfacing with every source system and target system imaginable. Working with the largest OEM partners, every project is a unique challenge, and a one-size-fits-all solution is ineffective. With this perspective, the company leveraged its team of DICOM experts, solution architects, developers, and project managers to create and embrace a new vision to support workflows and migration services. The solution addresses the needs of both OEM partners like GE, Philips, Siemens, Fujifilm, and direct customers in hospitals, imaging centers, and clinics.

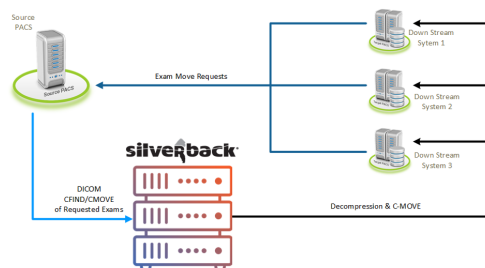
With the power of Silverback®, the DataFirst team sits with partners and clients to analyze specific environments, infrastructure, and data models to understand an enterprise's unique challenges and vision for connected healthcare. With this information and knowledge, the power of Silverback® is deployed to transform the existing environment into the desired, interconnected one.

Silverback® is comprised of an intelligent DICOM router coupled with the industry's most powerful migration engine. This workflow engine has been designed for the smallest of imaging centers yet is robust and scalable enough to meet the demands of multi-site IDNs and manage up to 2,000 modalities. The intelligent router also features distributive architecture based on time management profiles, which enables managing and moving images based on time, logic, and other customer-defined criteria. But most impressively, Silverback® can scale into a full-fledged distributive workflow engine that can federate individual sources, route information, complete anonymization, and deploy interoperability services using HL7 prefetch processes and DICOM-aware load balancing.

The scalable, intelligent workflow engine that the healthcare industry demands is finally here. Let us look at several workflow examples and case studies.

# WORKFLOW EXAMPLE #1

## - MULTI-VENDOR/NETWORK ROUTING



Multi-vendor/network routing is a common challenge for many healthcare organizations. This use case arose after a healthcare organization migrated data from a legacy system to a new storage solution. This example demonstrates a customer-defined routing environment interfacing with an unlimited number of sources and targets.

In this case, the healthcare organization's new storage solution could not negotiate transfer syntax with downstream systems that were the recipients of post-migration data images. Downstream systems would request the source PACS system to move data for comparison, enterprise-wide distribution, or CD burning, but a substantial number of transfers would fail. The new source PACS system could not decompress the data in a way downstream systems could receive.

The Silverback® workflow engine was placed in the middle of this operation. Rather than having the source system respond to the downstream systems directly, the source PACS system instead sent data requests directly to Silverback®, which promptly decompressed the study and negotiated a new transfer syntax the downstream systems could use.

The quick and seamless process was invisible to the downstream systems as they continued to request data from the new source PACS system. However, depending on what AET was initiating the request, the source PACS system was programmed to send data to DataFirst who determined the proper port and then sent it down one or more programmed routes.

These downstream systems could be built on subclass IDs or other inbound systems. With logic and compression profiles in the Silverback®, there is no disruption to the desired workflow regardless of the limitations of the source PACS system.

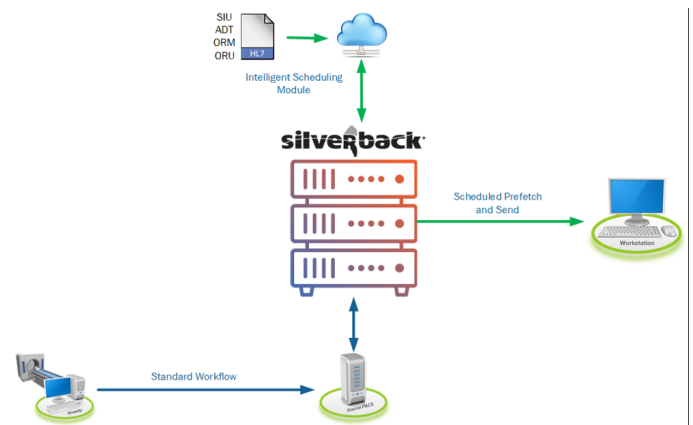
In summary, this case required ten downstream systems to receive data. The Silverback® router could seamlessly handle their unique compression needs and allow data to move easily between existing systems. These Silverback® compression profiles are unlimited and offer significant options for any healthcare enterprise's needs.

Here, the deployment of Silverback® allowed the healthcare organization to retire old infrastructure and reinstate its workflows. The organization previously had the burdensome task of maintaining the legacy PACS system until a solution came around that allowed compressed data to move through the existing ecosystem. The addition of intelligent software in the middle became an integral part of the organization's existing network. It required no ripping and replacing, but a simple deployment of Silverback® to solve a pressing medical imaging challenge.



## WORKFLOW EXAMPLE #2

### – CUSTOM PREFETCH



Prefetch is a common challenge DataFirst encounters in both migration projects and while managing operational workflow. DataFirst works extensively with clients to study the issues, identify triggers, and create relevancy tables integral to an environment-specific solution.

A common use case is the traditional mammography workflow. In this situation, DataFirst implemented a data solution for a multi-site, multi-state healthcare provider that had a sophisticated outpatient mammography business and several archives. The provider read on Hologic workstations with finite storage capabilities and regularly encountered an issue where prior mammography exams would not be available on the station when needed. Exams received on the Hologic workstations would effectively fall off because of FIFO storage logic in advance of the new mammography exam being performed.

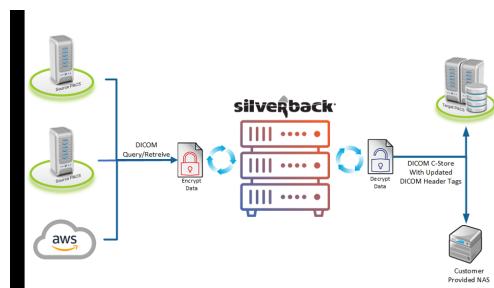
To solve this, the team created the trigger for the workflow using an SIU message sent by DataFirst's HL7 listener when the exam was scheduled. The message was then read, indexed, parsed, and compiled in a table where it was held until twenty-four hours before the scheduled examination. At that time, prior mammography exams would get queried from the organization's various legacy archives and sent to the Hologic workstations. Additionally, DataFirst filtered descriptions as well. Screening banks existed for various reading stations dedicated to different data types, such as screening mammography or diagnostic mammography. The procedure scheduled for the patient would be determined by description and a message was routed to the appropriate screening bank. Exams that suddenly become diagnostic because of a pathology detected during an exam, for example, could be intelligently rerouted to the diagnostic bank so relevant data was adequately and efficiently stored at all times.

The Silverback® workflow engine can build complex trigger actions that drive smart prefetch by way of SIU messages or orders. The workflow engine also supports a modality worklist to ensure trigger actions do not occur too late in the patient experience to be helpful. Adding HL7 gives the option to perform prefetch triggers in advance of new procedures to improve user satisfaction.

This interesting use case illustration is increasingly common. There are so many more examples of Silverback® sitting between an organization's VNA and front-end PACS. Intelligent prefetch is also beneficial in outpatient businesses that can fully benefit from advanced scheduling and image synchronization before and during exams.

## WORKFLOW EXAMPLE #3

### – NEW CLINIC/PRACTICE ACQUISITION



The third Silverback® case study arises from a new clinic or healthcare practice acquisition. This is increasingly common today as growth and consolidation continue across the industry in recent years. Silverback® fills the role of a powerful, robust, and flexible migration tool to move data and information from system to system, organization to organization.

DataFirst uses the platform in hundreds of migrations projects each year in every size, shape, and configuration possible. However, a typical example involves a hospital acquiring a clinic or outpatient practice only to discover that there is inadequate wide-area bandwidth to support faster or more complex migrations. In these frustrating cases, the Silverback® migration engine deploys next to the source PACS systems.

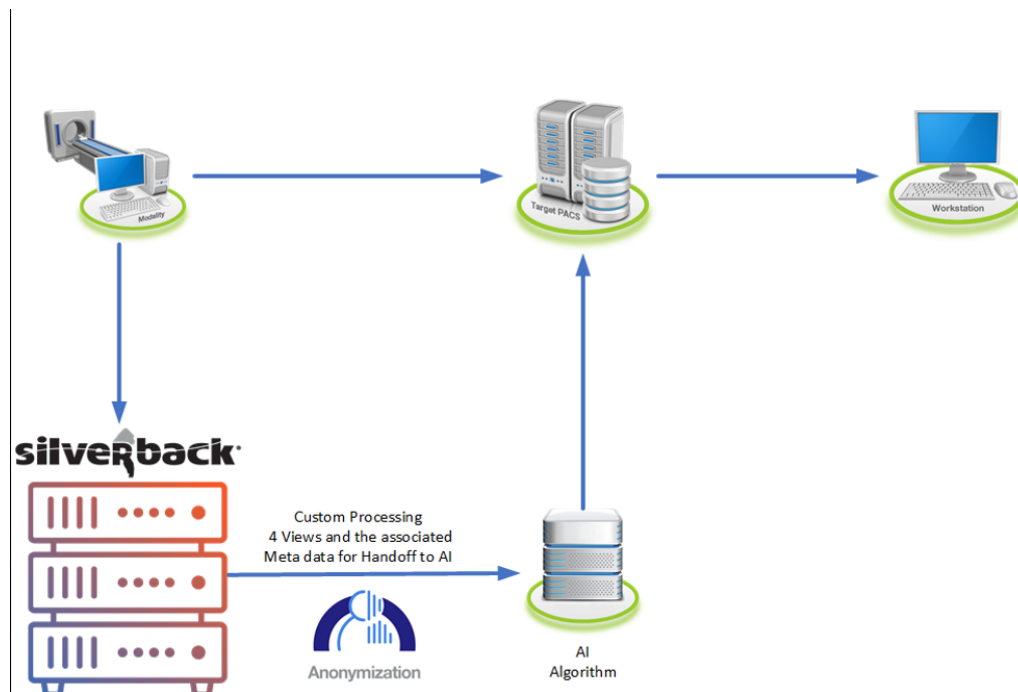
It may also integrate with cloud providers and pull directly from AWS storage from within the Silverback® application, for example, or be placed at a remote location and cached with legacy data inside Silverback®, where the database and DICOM files become encrypted. That allows the machine to be packed up and shipped with peace of mind that data is protected in transit. Upon arrival at the destination, the data is transferred to the target system's network where it is promptly decrypted while DICOM C-stores are performed to the new PACS. In other cases, data may be written to a network share, after which tag management or data cleansing is applied.

In essence, DataFirst acquires all the data, cleans it, and sends it along using customer-defined inputs, tag management rules, and/or logic profiles specific to the new PACS system. While common industry standards already exist, it is easy for Silverback® to change accession numbers to match a new target system scheme or replace legacy patient IDs with new medical record numbers. A fully integrated dashboard also allows end-users to log in and discover what has moved over the last few days, weeks, or months to obtain a quick, comprehensive snapshot of where the migration process stands.

Multiple inbound and outbound sources can be managed simultaneously. Silverback® can work with an old legacy PAC system holding radiology and cardiology data, for example, and split it to be routed to separate cardiology PACS and radiology PACS based on inputs that identified the data.

Migration sets can be further manipulated to allow identifying particular data groups, applying tag rules, and sending or omitting data to enable complete data management of studies. Finally, and perhaps most importantly, this comes with the prefetch functionality discussed previously.

## WORKFLOW EXAMPLE #4: ARTIFICIAL INTELLIGENCE (AI) INTEGRATION



Artificial Intelligence (AI) integration is one of the fastest-growing fields in healthcare. The promising benefits of AI integration are the topic of conversation at industry-wide conferences of the Healthcare Information and the Management Systems Society and the Radiological Society of North America.

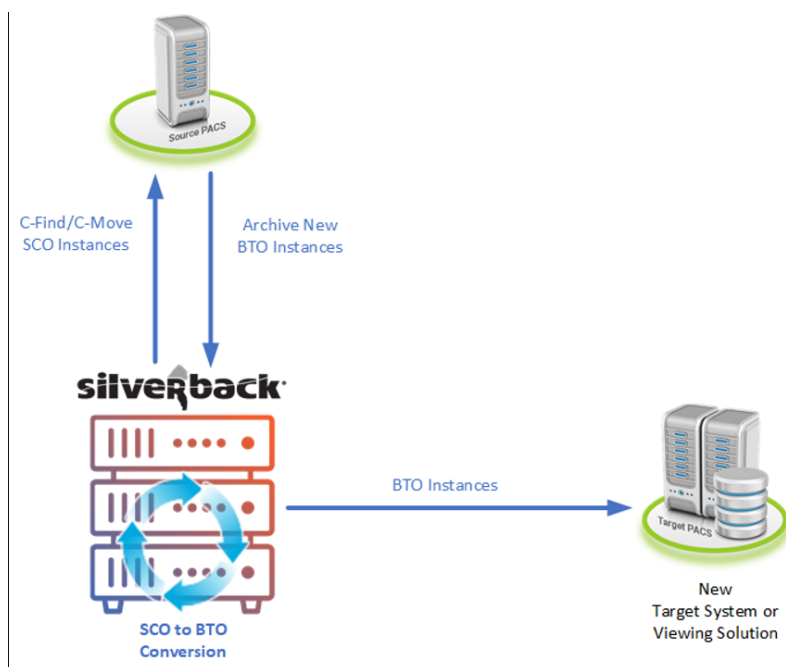
In line with this trend, DataFirst customers have been seeking ways to send healthcare data to AI companies with whom they have partnered. DataFirst's Silverback® framework help organizations not only mine-specific data for this purpose but anonymize and prepare it so that AI companies can use it to develop innovative applications and strategies without compromising privacy.

A North Carolina-based company recently partnered with DataFirst to roll out an intuitive clinical AI framework that did just that and calculated predictive positive mammography scores from two-dimensional images.

The new workflow routed traditional two-dimensional mammography units to a target PACS system and DataFirst simultaneously, where desired images were stripped of patient health information, anonymized, and then converted into specific formats for the AI algorithm to process. The data was then passed along the algorithm for conversion into a predictive score before being sent back to the target PACS. The overall process created valuable clinical data for the organization and its healthcare partners, demonstrating just one of the many benefits of AI integration.



## WORKFLOW EXAMPLE #5: SCO – BTO CONVERSION



DataFirst is helping our clients convert existing Hologic images from SCO file formats to BTO file formats. Organizations often seek ways to do this inexpensively without leaving their native environments, especially as more organizations begin to move away from legacy Hologic reading solutions as they acquire PACS systems with integrated mammography workflows, for example.

In these instances, clients want to take stored legacy SCO files and convert them into BTO files. DataFirst effectively facilitates this conversion in different ways, such as using C-FIND or database extracts to identify exams containing SCO instances from the source PACS. These exams are then moved to the Silverback® engine with C-MOVE and processed through Silverback's® innovative SCO to BTO converter before being sent to different target viewing solutions or PACS systems as a new data series. DataFirst uses either the legacy SCO instance IDs and returns the BTOs or creates a new series and set of SOP IDs at each stage, depending on organizational preference.

This powerful functionality can be accomplished in stages, allowing organizations to embrace an on-demand, as-needed approach. With the workflow engine, organizations can push exams into the workflow engine on-demand to be automatically processed through the SCO to BTO conversion and then routed out. This allows for a targeted approach that deals with conversions when needed. For example, patients that bring in SCOs that have been performed elsewhere need to be converted to BTOs for comparison using an organization's viewing solution, and this process is performed quickly.

## CONCLUSION

These three brief examples demonstrate the value of deploying Silverback® as intelligent software to address pressing interoperability challenges in today's healthcare environments. An award-winning, enterprise-grade workflow engine, Silverback® is working on the frontlines to address the countle.ss challenges facing our industry.

Join DataFirst for a comprehensive walkthrough of specific use cases that may affect your organization and learn how Silverback® will solve your unique imaging management challenges. Request a free trial of the Silverback® here and integrate your organization's data today.

To schedule a demo, talk with an engineer or sign up for a free trial - [Sign up today!](#)

2700 Sumner Blvd.  
Suite 130  
Raleigh, NC 27616

Phone: 919.876.6650  
Toll Free: 800.634.8504  
Fax: 919.876.6651

