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BEST PRACTICES

AWARDS

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2020 BEST PRACTICES AWARD

Hyland®

HEALTHCARE

2020 NORTH AMERICAN
ENTERPRISE IMAGING SOLUTIONS
PRODUCT LEADERSHIP AWARD

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Background and Company Performance

Industry Challenges

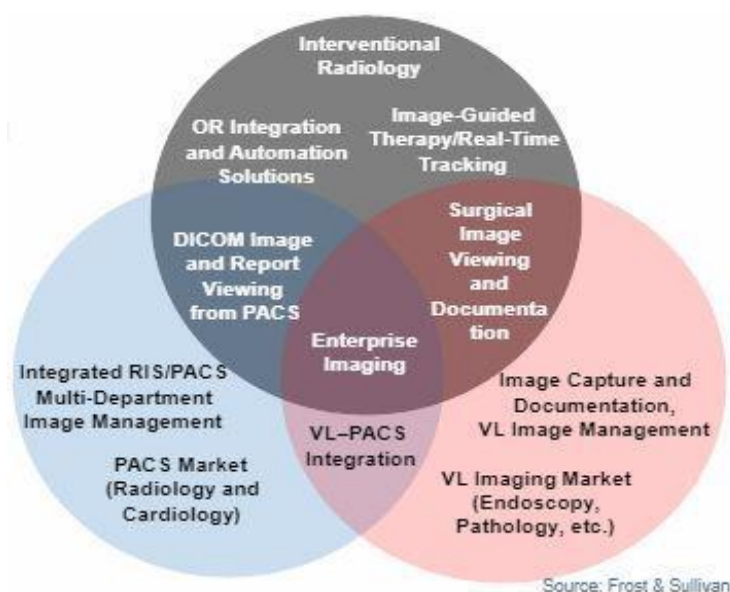
Healthcare’s ongoing digital transformation strives to lower costs while improving care quality and patient outcomes. Likewise, skyrocketing medical imaging-associated expenses drive digitization strategies to contain costs and improve care coordination.

Imaging informatics expanded to almost every clinical area over the last two decades following technological advancements and value-added, bundled services, such as vendor neutrality, web-based viewing, and mobility. Today, nearly all specialties generate both large digital imaging and communications in medicine (DICOM) and non-DICOM data files. All of the information is electronically archived—from radiology and visible-light images and electrocardiogram waveforms to digital pathology, lab results, and multi-media content—i.e., JPEG, PDF, documents, videos, emails, and mobile application (apps) data.

The heterogeneous medical imaging environment generates massive data sets daily, far outpacing traditional departmental picture archiving and communication system (PACS) archives’ limited functionality. During the last decade, Frost & Sullivan analysts overved how significant advances followed the launch of next-generation medical imaging and data management solutions that address the ever-mounting information complexities. Those efforts resulted in developing enterprise-class, vendor-neutral archives (VNA), gaining instant momentum as organizations increasingly implemented these solutions seeking to streamline long-term image data archives from existing PACS systems.

The crucial need to securely access and analyze all the data along the patient care journey better is driving a new generation of image and data management technology. Enterprise imaging consolidates medical images from multiple information technology (IT) systems, clinical archives, and imaging specialties for rapid retrieval and display.

Total Medical Imaging Informatics Market Convergence, Global,



Frost & Sullivan classifies the total enterprise imaging solution market into four major components, ideally integrated and with seamless operation:

- Universal imaging viewers
- Universal storage
- Clinical workflow tools
- Enterprise collaboration tools

Frost & Sullivan estimates the global enterprise imaging market at nearly \$934 million in 2018, growing at a compound annual growth rate of 11.3% to reach almost \$1.8 billion by 2024. The United States (US) market is the largest segment, accounting for approximately \$428 million, while Europe (EU) and the Asia-Pacific (APAC) regions account for \$309 million and \$196.1 million, respectively.¹

Workflow automation and teleradiology are the two primary drivers promoting enterprise imaging adoption. Healthcare systems leverage these solutions to tackle acute radiologists' shortages with enhanced radiology efficiencies and diagnostic expertise networks through image sharing. Thus, enterprise imaging's primary goal is to obtain, organize, store, and deliver seamlessly medical images and other longitudinal patient information from distinct healthcare IT systems for reading and reporting on a single viewer.

Given the value-driven landscape, more providers and healthcare facilities combine the imaging IT infrastructure and traditional PACS to improve overall image management services and radiology workflow efficiencies and reliability. Nonetheless, existing solutions are often quite ineffective, as medical departments across the healthcare enterprise—e.g., radiology, cardiology, pathology, dental, and other visible-light imaging specialties—use different PACS systems from various vendors. Despite today's third-generation imaging platforms extending connectivity and interoperability beyond radiology, these systems do not allow for data transfer between solutions or integration with electronic medical/health records (EMR/EHRs), creating vast data silos. As such, current offerings mainly involve niche solutions providing siloed data with limited content and context and separate analysis and reporting processes, producing suboptimal information for an evidence-based decision-making framework.

Today, health personnel engages in time-consuming activities, such as multiple system entries, searching for the same patients in various user interfaces, and accessing different image viewers from several vendors. While built to overcome these pitfalls, VNAs usually do not bridge the data gaps. Different specialties require distinct functionalities within their PACS viewers not available in VNA, rendering them inadequate. Furthermore, many VNAs do not integrate with EMRs, necessitating multiple manual data input points, and leaving clinicians with only partial patient views when making clinical decisions.²

¹ *Global Enterprise Imaging Solutions Market, Forecast to 2024* (Frost & Sullivan Report, September 2019)

² *Ibid*

Frost & Sullivan analysts concludes that next-generation medical imaging informatics must further support the shift to value-based care. Its ultimate success hinges on delivering the right care to the right patient at the right time.³ Vendors must align around outcomes-focused, sustainable healthcare, and, with higher costs to bear, help drive a cost-conscious, quality-demanding volume-to-value-transformation.

Product Family Attributes and Business Impact

Headquartered in Westlake, Ohio, and with clients worldwide, Hyland Healthcare (Hyland) is creating a new standard for managing, viewing, and exchanging DICOM and non-DICOM images and data across an enterprise. By properly overcoming traditional information silos between departments and information formats, Hyland expedites fully informed care decisions to further improve patient outcomes.

The company offers a full suite of content services and enterprise imaging solutions, bringing together structured and unstructured content into a single, comprehensive, and customizable view. As a result of its unmatched ability to enable enterprise-wide image and content viewing, Hyland has over 50% of the US hospital market leveraging its solutions.

With more than 3,400 employees worldwide, the company serves over 15,000 customers globally, including the US, EU, APAC, Latin America, and Africa, through 30 strategically located offices.

The Mantra: Putting the Enterprise First

Hyland is creating a new standard for PACS by taking an enterprise-first approach to capture, manage, view, share and collaborate on DICOM and non-DICOM images and patient data. Through a full suite of both content services and enterprise imaging solutions, the company allows healthcare systems to leverage previously unstructured content via integration with EMRs, delivering a complete patient view for improved clinical decision-making and higher care quality.

Traditional PACS systems struggle to associate images with the right patient, process image metadata, and store the data back into the EMR for future use. When images are not available to clinicians, they can't be used to support immediate care, multi-specialty collaboration is required, as well as additional patient monitoring. Frost & Sullivan observes how Hyland is nicely redefining enterprise PACS with its full suite of solutions. The company optimizes and streamlines data collection, transfer, and visualization, eliminating silos and empowering healthcare enterprises to enhance care, improve workflows, and maximize reimbursements.

Hyland's extensive platform enables EMR integration of previously siloed information regardless of format, both content and imaging data files, an unmatched offering within the industry. The full portfolio of solutions supports all modalities for data and image viewing—including 2D and 3D visualization and tools, multilinear reconstruction, PET-CT fusion, PET-MR fusion, computed tomography, MammoCAD, and structured reports. The company

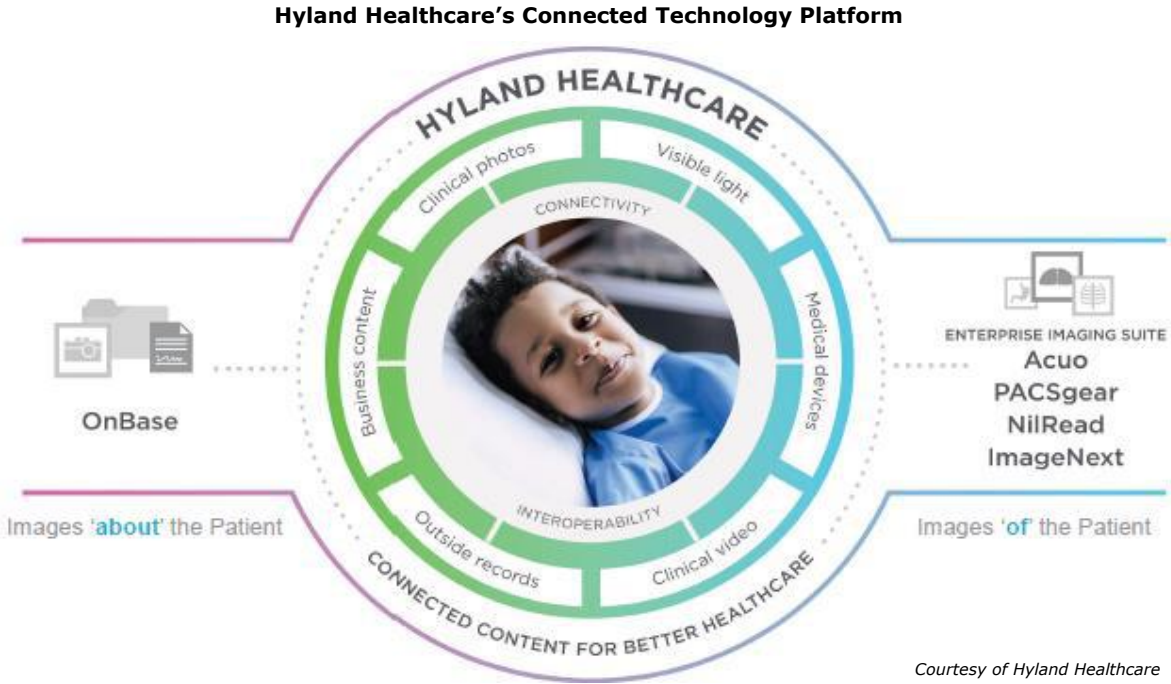
³ <https://www.pcori.org/events/2019/alliance-health-policy-briefing-right-care-right-patient-right-time-role-comparative>

facilitates unmatched enterprise-wide connectivity and collaboration, improving care quality and health outcomes.

Hyland developed its exceptional solutions with best-in-class tools and software integrations, ensuring that all aspects of its enterprise-wide solutions empower collaboration and streamline workflows without creating additional silos. Furthermore, as its products are vendor-neutral, healthcare organizations can choose specific solutions from its full portfolio of products and integrate them with existing systems, increasing the overall value.

A Full Suite of Best-in-class Technologies

Hyland’s full technology portfolio offers best-in-class image acquisition workflow and connectivity around PACS combining unwieldy objects, data components, and images into a single view integrated with the health enterprise’s EMR. Its solutions leverage advanced custom application programming interfaces (APIs) and context switching, incorporating them as part of an enterprise’s full solution to integrate with other vendor offerings, and elegantly bridging the gap between imaging and content. Clinicians can make more informed care decisions as they have access to the patient’s complete medical record and the viewer integrates and displays both content and enterprise imaging information regardless of DICOM and non-DICOM formats within the healthcare organization’s EMR.



Hyland’s VNA - Acuo: With its enterprise-first strategy for VNA components, Hyland designed its best-in-class universal archive to meet clinical, specialty, and diagnostic viewing needs both within and beyond radiology. Acuo creates a new viewing standard due to its unique interoperability, functionality, scalability, technical frameworks, and integration profiles. The platform brings enterprise-wide imaging information onto a single repository to

communicate seamlessly with core IT systems, such as an enterprise's EMR. Moreover, Acuo offers extreme scalability, supporting various clinic size needs spanning from one hospital to an integrated hospital network across different regions and specialties.

Hyland's Enterprise, Diagnostic Viewer - NilRead: Web-based, zero-footprint, FDA-cleared enterprise and diagnostic viewer built with differentiated and modern architecture for display on any device or browser platform. As the solution has no hardware or software dependency, a health enterprise can provision and manage servers as needed enterprise-wide. The universal viewer provides multi-modality viewing configurations across a range of basic and advanced visualization, allowing customization based on the user, department, or site need. NilRead delivers enterprise viewing of 2D image sets alongside advanced visualization tools for a spectrum of specialties, post-processing tools—i.e., MPR and 3D—and management tools to empower collaboration across the healthcare organization.

NilRead also connects multidisciplinary care teams, allowing simultaneous viewing of images and reports to make holistically-informed care decisions with the entire patient data history in full view. Finally, it empowers clinicians to securely share images or request images or studies via an upload link. Clinicians can then safely download studies to view, manipulate, or annotate in a collaborative session to make the highest quality care decisions.

Hyland's Workflow Optimizer - ImageNext: An advanced enterprise workflow optimization tool that goes beyond a basic diagnostic workflow list to provide an enterprise-wide workflow orchestration. The system matches the study with the proper physician to improve accuracy and throughput. Furthermore, the solution receives information from PACS or VNA systems to populate, organize, and manage studies, empowering automatic distribution based on physician criteria—i.e., location, specialty, and schedule.

Hyland's Capture and Connectivity Suite of Solutions - PACSgear: A suite of enterprise-class connectivity solutions that allow users to easily capture vital encounter-based images and videos, documents, and other media, and integrate them with a PACS, VNA, or EMR, boosting collaboration, productivity, and care quality.

PACSgear solutions include image connectivity tools that securely capture and connect images from surgical scopes, CDs and DVDs, and even smartphone camera rolls, ensuring consolidated and complete patient medical imaging records. They empower healthcare organizations to handle both order-and encounter-based workflows to obtain quality patient and procedure information, reconcile the data, and create orders as needed, eliminating data silos and workflow bottlenecks. Clinicians can share data—whether images, videos, or documents—regardless of form (e.g., DICOM or XDS) and specialty to any VNA, EMR, or PACS.

Advancing Patient Care through Customer-driven Innovation

Hyland focuses on ensuring that it is continuously meeting the customer's evolving needs, particularly digital healthcare's requirements. The company commissioned a self-governing diagnostic imaging task force comprised of radiologists across various institutions and subspecialties to analyze the spectrum of its enterprise imaging solutions. Members of the

commission identify missing components, workflow gaps, or unnecessary steps while performing tasks and notify Hyland of their findings.

The company estimates about a third of the commission's feedback results in onsite product configurations, providing user training and onsite service technicians to ensure that its solutions meet the subspecialty's needs. Another third of their observations infer capability underutilization. In turn, Hyland provides users with full training on the solution's capabilities to derive the highest product value. It is the final third of their requests—i.e., not associated with configurations or already integrated capabilities—that drive continuous innovation, meeting clinicians' specific needs within the field.

Its commitment to providing the highest product value and streamlining workflows underpin the customer experience, ensuring the highest return on investment (ROI) possible.

The company responds to a service request for new capabilities or to address issues quickly, usually responding to customer requests in a few days and integrating requests in upcoming releases whenever possible.

Continuing Investments

Hyland recognizes the vast potential of its ability to provide streamlined workflows, increased interoperability, and unmatched collaboration across the healthcare enterprise. The company focuses on eliminating silos in unmet applications relevant to the digital healthcare continuum, increasing its current product's value along the way.

Digital Pathology—Pathology slides' digitization is an emerging global trend that promises to accelerate diagnosis and treatment while enhancing pathologist workflows and ergonomics. Hyland is investing and working with international partners to develop a digital pathology solution that incorporates its zero-footprint NilRead enterprise, diagnostic viewer and Acuo VNA.

Artificial Intelligence—Hyland currently offers robust tools and services to accurately de-identify, prepare and package stored imaging records in Acuo for participation in third-party AI and machine learning programs used in clinical research and real-time patient care, such as precision diagnosis. The company also created a toolkit inside NilRead that supports advanced capabilities, like registration and segmentation, to identify and segment different body parts and organs. As a result, Hyland can either build or partner for intelligent tools for these images, enhancing use-cases and capabilities for clinical decision support.

Shift to the Cloud and SaaS —Many healthcare enterprises initially resisted cloud computing; however, the acceptance rate has skyrocketed as they recognize its value. Hyland foresaw the trend and designed its products with architectural characteristics conducive to a cloud-based system. Furthermore, as its solutions are zero-footprint and stream data to a browser, the company does not have hardware versions or requirements on enterprises' networks, making its solutions uniquely well-matched to transition smoothly to the cloud.

The cloud also empowers greater scalability, a quality already found within Hyland's portfolio. Furthermore, moving to a cloud-based platform enables dynamic server auto-

scaling—automatically removes servers as imaging volumes lower and increases servers as volumes increase—optimizing customers’ expenditures and maximizing ROI.

Hyland plans to deliver its full suite of products as a SaaS offering leveraging the Hyland Global Cloud Services’ security and management. Also, as many of its customers have pre-developed relationships with cloud providers, the company will continue its offering in both public and private clouds to meet each client’s specific needs.

Stronger Together: Fighting the COVID-19 Pandemic

Hyland has cultivated a global reputation for innovation tailored to customer’s needs. The company stays true to its reputation with its response to the COVID-19 pandemic.

Hyland is continuously looking for ways to address and adapt patient assessment and care delivery with limited contact. The company is currently offering its extensive zero-footprint viewer, NilRead, for patient engagement and remote reading support and its PACSgear solution to back point-of-care ultrasound for no charge or obligation with delayed invoicing for installation. By providing its platform for free, healthcare organizations can experience Hyland’s solutions, tools, and efficiencies first-hand. They can purchase the solutions after the pandemic, if desired, by merely signing up. Otherwise, customers can turn off the software.

Through this gesture, Hyland demonstrates social responsibility—empowering provider collaboration and image viewing on the NilRead viewer, enabling image distribution via the Acuo platform, and integrating images onto patients’ EMRs to enhance overall care, all within contact-free workflows.

Conclusion

Traditional digital image archives remain quite difficult to use and share within and across the healthcare enterprise. Additionally, electronic medical records (EMRs) and other non-DICOM systems cannot handle diagnostic-quality medical images. Current offerings mainly involve niche solutions providing siloed data with limited content and context and separate analysis and reporting processes, creating workflow bottlenecks and impacting care quality.

Frost & Sullivan applauds the way that Hyland Healthcare is redefining enterprise PACS with its best-in-class full technology suite. The company’s enterprise-wide solutions optimize and streamline data collection, transfer, and visualization, eliminating informational silos and empowering healthcare organizations to deliver cost-effective quality care while optimizing customers’ expenditures and maximizing return on investment. Hyland Healthcare’s extensive platform enables EMR integration of previously siloed data, whether content or imaging files. This is truly an unmatched offering within the market, positioning the company’s solutions to become the new standard for enterprise imaging solutions.

With its strong overall performance, Hyland Healthcare earns the 2020 Frost & Sullivan Product Leadership Award.

Significance of Product Leadership

Ultimately, growth in any organization depends on customers purchasing from a company and then making the decision to return time and again. A comprehensive product line filled with high-quality, value-driven options is the key to building an engaged customer base. To achieve and maintain product excellence, an organization must strive to be best in class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding Product Leadership

Demand forecasting, branding, and differentiating all play critical roles in finding growth opportunities for your product line. This three-fold focus, however, must be complemented by an equally rigorous focus on pursuing those opportunities to a best-in-class standard. Customer communication, customer feedback, pricing, and competitor actions must all be managed and monitored for ongoing success. If an organization can successfully parlay product excellence into positive business impact, market share will inevitably increase.

Key Benchmarking Criteria

For the Product Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Product Family Attributes and Business Impact—according to the criteria identified below.

Product Family Attributes

- Criterion 1: Match to Needs
- Criterion 2: Reliability and Quality
- Criterion 3: Product/Service Value
- Criterion 4: Positioning
- Criterion 5: Design

Business Impact

- Criterion 1: Financial Performance
- Criterion 2: Customer Acquisition
- Criterion 3: Operational Efficiency
- Criterion 4: Growth Potential
- Criterion 5: Human Capital

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate Award candidates and assess their fit with select best practices criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 Monitor, target, and screen	Identify Award recipient candidates from around the world	<ul style="list-style-type: none"> • Conduct in-depth industry research • Identify emerging industries • Scan multiple regions 	Pipeline of candidates that potentially meet all best-practice criteria
2 Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> • Interview thought leaders and industry practitioners • Assess candidates' fit with best practices criteria • Rank all candidates 	Matrix positioning of all candidates' performance relative to one another
3 Invite thought leadership in best practices	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> • Confirm best practices criteria • Examine eligibility of all candidates • Identify any information gaps 	Detailed profiles of all ranked candidates
4 Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> • Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles 	Final prioritization of all eligible candidates and companion best practices positioning paper
5 Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> • Share findings • Strengthen cases for candidate eligibility • Prioritize candidates 	Refined list of prioritized Award candidates
6 Conduct global industry review	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> • Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates 	Final list of eligible Award candidates, representing success stories worldwide
7 Perform quality check	Develop official Award consideration materials	<ul style="list-style-type: none"> • Perform final performance benchmarking activities • Write nominations • Perform quality review 	High-quality, accurate, and creative presentation of nominees' successes
8 Reconnect with panel of industry experts	Finalize the selection of the best practices Award recipient	<ul style="list-style-type: none"> • Review analysis with panel • Build consensus • Select recipient 	Decision on which company performs best against all best practices criteria
9 Communicate recognition	Inform Award recipient of recognition	<ul style="list-style-type: none"> • Announce Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance 	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 Take strategic action	Upon licensing, company is able to share Award news with stakeholders and customers	<ul style="list-style-type: none"> • Coordinate media outreach • Design a marketing plan • Assess Award's role in strategic planning 	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, resulting in errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.



About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, helps clients accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's growth team with disciplined research and best practices models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages nearly 60 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on 6 continents. To join Frost & Sullivan's Growth Partnership, visit <http://www.frost.com>.