

A multi-center PACS implementation to support 360° comprehensive patient care

How Fondazione Don Carlo Gnocchi unified imaging across eight centers to streamline diagnostics and prepare for integrated care

Who:
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Where:
Don Carlo Gnocchi Foundation (FDG) - 6,700 professionals, 3,720 beds, 90,000+ studies annually, 50+ structure across 9 Italian regions

Challenge:
Replace isolated PACS systems with a single unified platform that can scale, consolidate multiple workflows in a single workspace covering 7/7 days, facilitate stronger collaboration between clinicians

Solution:
Single unified Hybrid Cloud PACS with Disaster Recovery - business Continuity

Modernizing radiology across one unified network

Managing imaging across multiple healthcare facilities requires more than technology. It demands a platform that standardizes workflows, connects clinicians, and provides secure access to patient information wherever care is delivered. Fondazione Don Carlo Gnocchi (FDG) is one of Italy's leading non-profit organizations dedicated to rehabilitation, long-term care and research. With more than 6,700 professionals, 3,720 beds, 25 residential centers and 28 outpatient clinics across nine Italian regions, the Foundation provides highly specialized care to patients with complex clinical needs.

Guided by this vision, Fondazione Don Carlo Gnocchi launched a RIS-PACS transformation project to replace four legacy PACS solutions with a single hybrid-cloud imaging platform supporting both clinical practice and research while creating the foundation for future Enterprise Imaging initiatives.

Philips: a trusted transformation partner

Replacing multiple PACS systems without disrupting clinical operations required deep expertise in enterprise imaging, data migration and interoperability. Philips was selected as the technology partner to deliver a scalable imaging infrastructure capable of supporting FDG's long-term digital transformation.

Key results* achieved:

200.000 studies successfully migrated

30% demographic misalignment gap resolved, significantly improving data consistency

TAM3[1]: 6.4/7 average score
across usefulness, ease of use and behavioral intention

High user satisfaction
for system reliability and efficiency

*Results from case studies are not predictive of results in other cases. Results in other cases may vary.
1 A quantitative analysis based on Technology Acceptance Model (TAM) version 3, resulted in an average score of 6.4/7 for the three evaluation pillars, thus testifying the ease of use, but also how the user wants and will continue to use the new technology



"Our mission is to care for people with the same quality and consistency wherever they are. Reducing fragmentation is not just an IT objective, it is how we ensure safer care, better research, and true continuity for every patient across all our centers."

Dr. Lorenzo Brambilla, Director of Medical and Social Care Services, Fondazione Don Carlo Gnocchi ETS

Three pillars of transformation: mapping a complex, multi-regional network

Better integrations for less data misalignment

For FDG, consolidating imaging was never simply replacing the current PACS. It was about creating one trusted imaging ecosystem where clinicians, researchers and multidisciplinary teams could securely access the same patient information regardless of location. The project connected eight imaging centers across seven facilities in five Italian regions - handling approximately 90,000 studies annually - integrating a centralized PACS, Enterprise Viewer, a single RIS and imaging modalities into one unified environment. Cloud infrastructure reduced hardware requirements while improving business continuity, scalability and sustainability. The RIS-PACS initiative kicked off with an in-depth technical and clinical assessment. The goal: implement a centrally hosted PACS system, supporting the whole imaging production, while integrating with a single RIS and diagnostic equipment across all locations. The project included also an Enterprise viewer that made imaging easily accessible across multiple sites and departments, ensuring streamlined workflows, rapid access, and high-quality diagnostics. This enables to share a unified platform - simplifying IT operations, reducing hardware footprint, and optimizing maintenance.

From a technical standpoint, it was necessary to optimize resources by eliminating obsolete hardware components and boosting sustainability of the platform by moving into the cloud. A redesign of the messaging architecture also resolved nearly 30% of demographic inconsistencies identified in legacy archives, identified during the analysis of radiological studies archived in the old production PACS systems, leading to a significant improvement in the consistency of data.

Delivering integrated imaging with site-specific control

Initial testing simulated radiological data packets moving between centers and the primary data center. The results on latency and bandwidth usage paved the way for a fully cloud-based PACS system, pending network enhancements. In July 2023, following a rigorous selection process, FDG chose Philips for the PACS solution, while keeping their existing RIS provider.

"Through a deep analysis of our workflows and historical data, we developed a detailed technical specification that enabled us to identify the right partner to meet both our technical and organizational requirements."

Eng. Gianluca Rocchi, Head of Digital Transformation and Application Development, Fondazione Don Carlo Gnocchi ETS

"Reducing fragmentation means enabling teamwork. A single, trusted imaging repository allows clinicians, researchers and care teams to work from the same patient — securely, consistently and with the patient truly at the center."

Dr. Lorenzo Brambilla, Director of Medical and Social Care Services, Fondazione Don Carlo Gnocchi ETS



Eng. Rocchi, Prof. Baglio and Dr. Lipari, at IRCCS Santa Maria Nascente, Fondazione Don Carlo Gnocchi

The integration phase started with infrastructure setup and extensive testing to ensure flawless communication between RIS, PACS, and other internal applications. The system architecture features a single physical component hosting the PACS, logically segmented to serve each site while interfacing with diagnostic devices. Data backup leverages a secure cloud (non-AWS) environment, and access is controlled via Active Directory integration. The infrastructure setup began shortly after, with the first site (IRCCS Santa Maria Nascente in Milan) going live by February 2024 and full deployment across all sites by November 2024. More than 200,000 studies were successfully migrated while maintaining uninterrupted clinical operations.,

"In just five months, thanks to the rapid and professional deployment by Philips and the internal expertise of our Subject Matter Experts, we have successfully implemented a centralized PACS system for 8 centers in 8 different regions that will make all our centers operational within thirteen months." shares Eng. Gianluca Rocchi, Head of Digital Transformation and Application Development, Fondazione Don Carlo Gnocchi ETS.

The new platform also complies with regulatory requirements, including the integration of a patient dose management module communicating via HL7 messaging with both RIS and PACS. The implementation of the new system allowed the clinical and research center also to rigorously separate research and clinical activities, ensuring efficiency in both fields, while adhering to the highest standards of security and privacy.

The project was conceived and developed within the framework of the "INNOVA - Italian Network of Excellence for Advanced Diagnosis" initiative, funded under the Complementary National Plan (PNC -Health Ecosystems) of the Italian Ministry of Health, Directorate-General for Health Research and Innovation (PNC-E3-2022-23683266, PNCHLS-DA).

"We now have a single archive for all research activities, with strict regulation of access to data collected in clinical studies and full compliance with GDPR and informed consent requirements. This allows us to efficiently carry out all our research activities, overcoming the limitations of separate archives while maintaining a unified patient registry. For patients, this means that if they need clinical access, their complete imaging history is available. This unified system benefits both the research and clinical activity, creating a mutually supportive environment" reinforces Prof. Francesca Baglio, Deputy Scientific Director of IRCCS "Santa Maria Nascente" and Director of CaDiter (Advanced Center for Rehabilitation Diagnostics and Therapy), Fondazione Don Carlo Gnocchi ETS.

Beyond improving operational efficiency, the centralized repository also reflects FDG's broader strategy of transforming imaging into a shared clinical and research asset rather than a collection of isolated archives.

> "The unified PACS has enabled more efficient execution of research projects by eliminating all low-value tasks related to data exchange based on CD production, while simultaneously ensuring data consistency and security for the future."
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> **Prof. Francesca Baglio, Deputy Scientific Director of IRCCS "Santa Maria Nascente" and Director of CaDiter (Advanced Center for Rehabilitation Diagnostics and Therapy), Fondazione Don Carlo Gnocchi ETS**

Enhanced efficiency, usability, and research horizons: Imaging when and where it's needed

Enterprise Viewer transformed access to imaging across the Foundation. Images and reports are immediate access to requested exams, optimizing waiting times and overcoming difficulties related to viewing exams stored on CDs , allowing clinicians across different specialties to collaborate around the same patient information. Additionally, it eliminated the need for radiographic film printing for those exams requiring measurements, as these can now be performed directly within the application. The platform interfaces directly with diagnostic equipment across all centers, enabling rapid image acquisition, storage, and retrieval. Radiologists and clinicians benefit from faster access to imaging studies, improving diagnostic confidence while strengthening multidisciplinary collaboration. "Seamless access to images is crucial for consulting with fellow radiologists but above all with clinicians to simultaneously integrate clinical and imaging perspectives, enhancing diagnostic confidence and fostering effective teamwork to have the patient at the center" says Dr. Susanna Lipari, "we provide the initial impression, then it's all about collaboration to integrate daily clinical observations with the information from imaging, forming clinical pictures of varying complexity."

The introduction of Enterprise Viewer not only has further enhanced the collaboration between wards and imaging departments but has also represented a significant gain in efficiency of communication making the report and results readily available for clinicians. As shared by D.ssa Lipari, and also echoed by Prof.ssa Baglio, the impact on the clinical departments has been significant, helped to speed up clinical activities by allowing direct access to reports, which are now available electronically rather than on paper. "We moved from having reports available within days, to have images and reports readily accessible within hours from the exams." Concludes Dr. Susanna Lipari

One year after implementation, user feedback confirmed high levels of usability, reliability and efficiency, with an average TAM3 score of 6.4/7.

Based on Technology Acceptance Model (TAM) version 3 Model, on a subset of 100 users' representative of the most impacted professional, Perceived Usefulness (PU), Perceived Ease of Use (PEU) and Behavioral Intention (BI) reached on average a score of 6.4/7 in all categories.

Excellent reliability and efficiency were highlighted by all professionals as key highlights for the new system according to a systematic review conducted applying the principles of the User Experience Questionnaire. "In summary, the introduction of the new PACS has equipped the IRCCS Don Carlo Gnocchi facilities with an efficient and scalable system for the future, resulting in an estimated 30% increase in efficiency and higher productivity in terms of the number of exams. It has also streamlined all IT processes—such as preparing reporting workstations—enabling the sustainable planning of future system enhancements." concludes the Eng. Gianluca Rocchi.

"The system's efficiency and reliability have built user trust. It's not just powerful, it's intuitive, and that matters in clinical settings."

Dr. Susanna Lipari, Neuroradiologist and Researcher, IRCCS "Santa Maria Nascente," Fondazione Don Carlo Gnocchi ETS





Building the foundation for Integrated Diagnostics

Beyond operational improvements, FDG now sees its centralized imaging platform as a strategic asset supporting future models of care. This evolution aligns with a broader vision of Integrated Diagnostics approach, where imaging, clinical information and future AI-enabled decision support come together to provide clinicians with a more comprehensive view of each patient's condition throughout the entire care journey

"Artificial intelligence should never be an end in itself. It must be integrated into clinical practice to make care more efficient and support better decisions, while always keeping healthcare professionals at the center and fully respecting patients' safety and privacy."

Dr. Lorenzo Brambilla, Director of Medical and Social Care Services, Fondazione Don Carlo Gnocchi ETS

Looking ahead, FDG's ambition is to evolve from a radiology PACS toward a true Enterprise Imaging platform, progressively integrating imaging from multiple specialties into a single ecosystem that supports continuity of care, clinical research and multidisciplinary collaboration: progressively extend the platform beyond radiology, incorporating cardiology imaging and other clinical specialties to support integrated patient pathways across rehabilitation, outpatient care and home care, connecting imaging information across every stage of the patient's journey.

"Our ambition is to evolve from a radiology PACS into a true Enterprise Imaging platform. Images should follow the patient throughout the entire care pathway—not only inside the hospital, but across rehabilitation, outpatient services and home care, supporting clinicians with the right information at every stage."

Dr. Lorenzo Brambilla, Director of Medical and Social Care Services, Fondazione Don Carlo Gnocchi ETS

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