RIS PACS Advanced Workflow Management

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The Relevance of a Vision

THE DIGITAL REVOLUTION

Healthcare informatics has a recognized role to provide the backbone of healthcare reform and improvement. On the other hand, progresses in diagnostic imaging are leading to new, emerging and challenging clinical applications. In this scenario, ESAOTE has designed and developed SUITESTENSA, a software conceived for radiologists and devoted to simplify and make more efficient the workflow in diagnostic departments. SUITESTENSA turns, first in the competitive RIS PACS arena, the concept of structured report into a real application, changing the way in which radiologists present their findings to specialists and clinicians.

Anticipate future requirements

At ESAOTE a group of software engineers work closely with end-users and opinion leaders to anticipate future requirements. SUITESTENSA takes its birth from more than a decade of experience in the RIS PACS market, of which the last three years entirely dedicated to this innovative software conception and development. The idea at the base of SUITESTENSA is two-fold: on the one hand, to adopt a technology that can overpass many of today's limitations in terms of e.g., computational power, user interface, co-existence with new operating systems. On the other hand, to reach a substantial redesign of the radiological workflow where radiologists and other operators are guided by interactive or semi-automatic tools, making their daily work smoother and more qualitative.

Promote the quality of care and improve patients' safety

A common understanding is that RIS PACS systems introduce cost savings by, e.g., eliminating the need of printing films. SUITESTENSA benefits are not limited to this. Better and timely medical decisions mean improvement of quality and quality-assurance programs, which positively affect patient safety. SUITESTENSA enables radiologists to work smarter and more efficiently, providing solutions tailored exactly to their needs.

SUITESTENSA for Diagnostic Imaging Department

- Just one single application solution for imaging departments
- A vendor-neutral approach: modality-and-film independent
- Multi-modality imaging management
- Interactive structured report production
- Web-enabled highly scalable software architecture
- Scalable hardware architecture to keep on line thousands of examinations
- Centralized user profiles
- Customizable reading protocols
- Digital signature and digital preservation of images and data
- 2D, 3D & 4D advanced clinical packages for image processing and reconstruction
- Integrated data extraction engine
- Integrated speech recognition software

SUITESTENSA for Enterprise Healthcare Networks

Multi-departmental and multi-site healthcare departments introduce new needs in terms of software architecture and hardware set-up. SUITESTENSA RIS PACS easily support mixed architectures to perform optimally under any circumstance, adapting a project to customer needs and available infrastructures.

- Tight integration with HISs (ADT, EPR, Repositories, etc.)
- Integration with Hospital Information Systems and modalities via HL7, DICOM 3.0 and FDA-XML
- Systems' interoperability avoiding data duplication
- Full support of mass storage devices (e.g., NAS, SAN, etc.) and architectures
- Incremental disaster recovery options, according to user needs
- Advanced image compression features and image delivery options
- Availability of patient folder through MPI – Master Patient Index
- Tele-consulting and second-opinion functionalities
- Images and information access over local or remote networks

Workflow
Processing
Integration
Scalability

Innovative RIS PACS Conception

WORKFLOW MANAGEMENT IN ONE POWERFUL SOLUTION

There are no more lines that separate RIS from PACS: SUITESTENSA bridges applications in a new and innovative way with the result of simplifying the workflow during all phases of radiological activities. Based on web-enabled technology, SUITESTENSA exploits DICOM 3.0, HL7 and FDA-XML standard communication protocols, supporting systems' interoperability and avoiding data duplication. Its innovative user-customizable viewing and configuration concept is largely independent from the workstation's physical location and hardware used.

Customize each workplace

- Interface and layout can largely be customized with user preferences and reading protocols
- User can log on any workstation, automatically recalling his/her profile
- User interface can be adapted to room lights
- Each textual area can be edited with the help of formatting tools
- Simultaneous viewing of several examinations and multiple dataset, volume synchronization and comparison
- Self-explaining smart icons and on-line tips
- DICOM 3.0 worklists for communicating with diagnostic modalities
- Annotation and measurement tools with extensive parameter settings

Share information

- Patient folder with prior examinations is always available during the reporting phase
- Integration with hospital and other information systems is based on new and emerging standards such as XDS (Cross Document Sharing Profile) for Clinical Data Repositories access
- Patient CD, containing structured report and exam details, can be published from any workplace
- Clinical departments get access to reports and images according to pre-defined and secure access policies
- Scientific and teaching jobs are largely facilitated: cases can be indexed, anonymized and exported into logical archives

Keep focus on important things

- Structured report is a reality with SUITESTENSA: radiologists can increase the content of reports with key images, findings and quantitative data
- Advanced 3D and 4D processing and reconstruction software for any clinical protocol largely improve diagnostic capabilities
- Automatic speech recognition is fully integrated with reading protocols: radiologist can dictate reports while processing and interpreting images
- European directives on privacy and secure archiving policies
- Digital preservation of images and reports, digital signature (Italian CNIPA)
- Triple-level password-protection access system

Powerful data extraction tools

- Data extraction of all fields in the database with multi-parametric queries
- Integration with *Microsoft Excel*® for data extraction, analysis and interpretation
- Customizable filters with specified date interval which can be saved and launched at any time
- Customizable Case Report Forms (CRFs) for supporting clinical trials: cases can be indexed, anonymized and exported into logical archives
- Compliance with datasets rules of national and international reference associations
- Periodic reports with details of radiological activities can be predefined and exported in customized layouts

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Change thinking reporting

SUITESTENSA is innovating the way radiologists produce and distribute reports. The structured reporting functionality is combining quickness with efficiency, allowing to share key images, observations and associated measurements with specialists and clinicians.

- Standardize radiological outcomes
- Keep processing results recorded
- Keep trace of each finding
- Import measurements automatically
- Create customizable structured data specific for each modality

- Use free text and/or customizable coding and classification system
- Use configurable publishing functions with key objects and presentation states
- Get quick access to patient folder
- Use combos, pre-defined fields and pre-defined templates
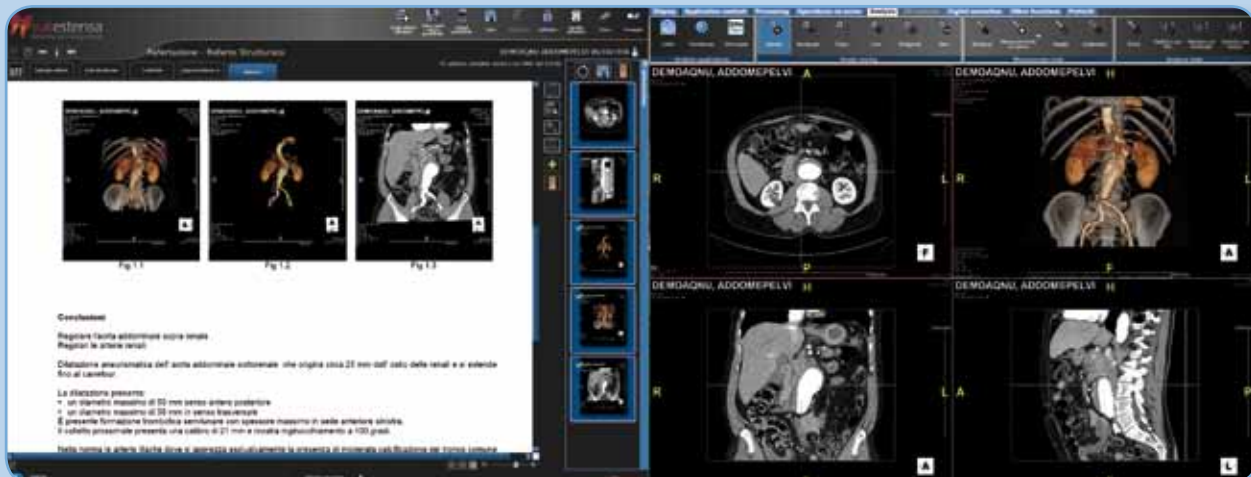
SUITESTENSA Structured Report
Shape the Future of Radiology Reporting

Facilitate clear communication

- Support all radiological modalities with pre-defined and user-defined reading protocols
- Simple navigation and volume scrolling, with drag-and-drop functionality
- W/L dynamic real-time adjustment
- Image rotation, zoom, pan and flip tools
- Annotation and measurement tools: line thickness, colour, reference lines on correlated images, etc.

- Simultaneous viewing of several examinations, volume synchronization and comparison
- Clip mode visualization for dynamic images, with playback control
- Integration with *Microsoft PowerPoint®* for exporting still images and cines in various common and compressed formats
- Various workspace arrangements: syde-by-side visual comparison, series preview, prior comparisons, etc.

Increase Image Interpretation for Better Clinical Decisions

UNPARALLELED 3D VISUALIZATION TECHNOLOGY

SUITESTENSA offers unparalleled 3D visualization technology for large CT, MR or PET datasets reviewing, processing, editing and interactive manipulation. With a large availability of clinical tools, SUITESTENSA meets any 3D processing need of radiologists, technologists, cardiologists and referring physicians. SUITESTENSA solution easily integrates with established clinical infrastructures allowing a complete and integrated RIS PACS and 3D applications workflow. (*)
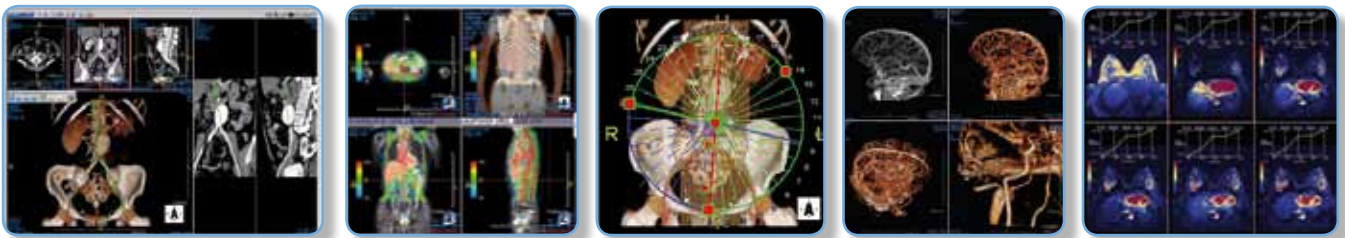
Get inside CT, MR & PET scans

- Vascular analysis
- Coronary artery mode
- Aortic mode
- Cerebral, carotid, renal and peripheral vascular cases
- Non-luminal structures analysis (soft plaque, calcified plaque, intra-mural lesions)
- Coronary calcium scoring
- Left ventricular volume and ejection fraction, myocardial volume (mass) and wall thickening from multiphase CT data
- Left Atrium Analysis
- Simultaneous side-by-side lung review
- Sphericity filter for lung and colon

- Flythrough: CT colon review, endoluminal visualization for blood vessels, etc.
- Segmentation analysis and tracking for idetifying pulmonary nodules
- Dental Analysis of CT scans
- Brest MR: time-dependent region-of-interest tools, to plot time-intensity graphs of a given region
- Image Fusion
- Endograft planning virtual stents/grafts
- 3D Triangulate: biopsy and procedure planning
- Cobb Angle: scoliosys analysis
- Real time navigation around and through a vessel (intra-luminal visualization)

Turn images into clinical decisions

- Multi-modality review (CT, MR, PET, US, CR and DR)
- Sinchronized review of multiple dataset
- 2D and 3D Batch (Movie Tool): creation of movies with customizations interpolated automatically to generate a smooth movie
- Scenes concept: saving of a work-in-progress analysis session
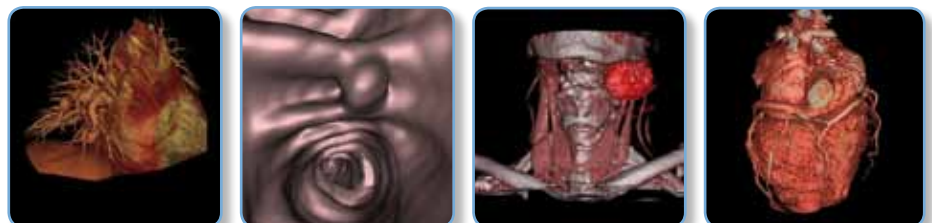
(*) 3D Volume Rendering Software developed by TeraRecon Inc; pictures and screenshots courtesy by TeraRecon, Inc.

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High-end tools for streamlined workflow

- 4D Review for CT and MR
- Medial Axial Reformat
- CTA-CT Subtraction
- Time Density Analysis (TDA)
- Dynamic Region Grow
- Multi-mask rendering
- Multi-planar-reformat (MPR)
- Curved planar reformat (CPR)
- MIP/MinIP Max/Min Intensity
- Filters
- Axial, coronal and sagittal planes 3D location reference
- Volume calculation
- Cube View
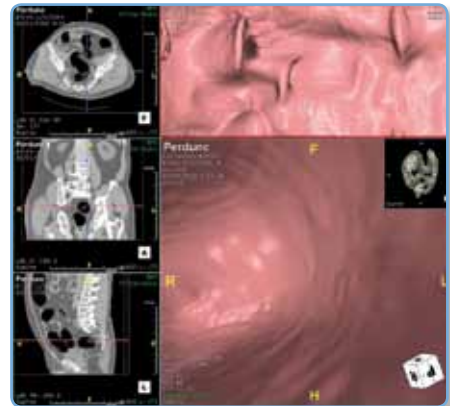
Interventional Radiology

The newest functionalities for endovascular procedures

SUITESTENSA delivers specific functionalities for endovascular procedures:

- Clinical and procedural data collection for all endovascular procedures
- Tracking consumables usage during the procedures
- Structured reporting specific for all anatomical districts
- Stock management, with integrated bar code reader and lot management
- Comprehensive data extraction engine for reporting clinical activities
- Digital Substraction Angiography Analysis to improve contrast medium visibility without increasing contrast medium quantity
- Edge Enhancement
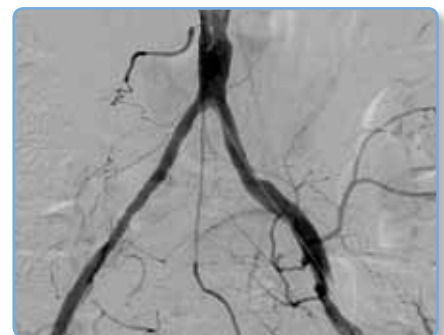
Angio atlas

SUITESTENSA provides an interactive graphical ANGIO ATLAS with complete vascular district maps for stent, stenosis, aneurysm mapping on aortic arch branches, thoracic aorta, inferior limbs, renal arteries and addominal aorta district:

- Accurate lesion classification
- Segments can be created, deleted and moved (including external or intracoronary bypasses)
- Default and customizable maps with free text entry and zoom/pan tools
- Graphical definition of stents, aneurysms, stenosis

- Stenosis characterization (irregularity, presence of calcium, thrombi, forks, collateral circuit, bore of the stenotic branch, etc.)
- Adjustment of any eccentricity

Supporting the Needs of Clinical Departments

⚘ A COMPREHENSIVE APPROACH

More and more clinical departments progressively make extensive use of radiological images as a support at their work. SUITESTENSA's pervasive and extra-radiological approach, cover such needs with the ambition of being a point of reference for images and auxiliary data.

⚘ Nuclear Medicine

Fusion imaging

SUITESTENSA has enabled enterprise-wide distribution of PET/CT studies along with advanced fusion and 3D rendering capabilities, facilitating communication between the multiple physicians involved in the care of the oncologic patient. Image Fusion supports image overlapping from different or identical modalities. Hence, CT data may be fused with CT, MR or PET and vice versa (*).

- Parametric revision of functional data and contextualized anatomical data
- Automatic rigid registration
- Volumetric visualization in 3D or oblique planes
- Standardized Uptake Value (SUV) readout for certain PET exam types
- Exact position of a lesion or tracking growth of a structure over time
- Fusion of any examination that provides anatomic references with any functional type examination
- Movement of images and rotation
- Customizable color scheme of fusion and window/level parameters, which can be saved as models
- Database of fusion templates
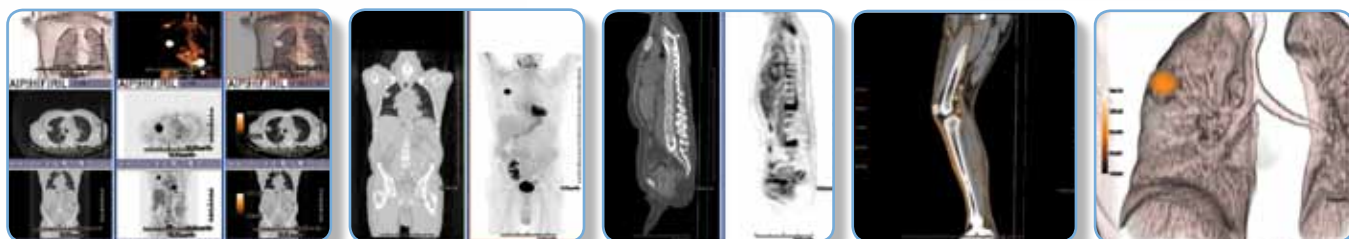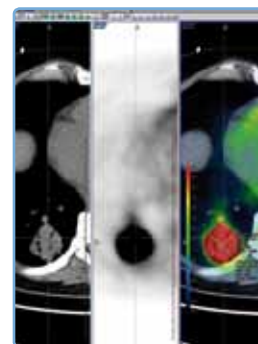
Radiopharmacy Software Management

- Integration with radiology information systems through HL7 protocol
- Standardized execution of daily procedures
- Patients database with complete dose traceability (availability, preparation, administration, discharge report)
- Correct preparation of radiopharmaceuticals, testing the percentage of bond and radiochemical purity
- Patient-customized dose calculation with information on age, weight, length of time, etc.
- Minimum and maximum level of volume/activity for each radioisotope, with preparation alert and real time decay
- Registration of dose administration per patient, injection time, personnel involved, syringe volume
- Quality control also on expired pharmaceuticals
- Pharmaceuticals traking and stock management
- Shipping register per elements, activity, units of measurement, quantity, chemical form, physical state, calibration date, order number, supplier batch, etc.
- Dedicated report and label printing for activity, volume, patient, supply, dose, lot, etc.

(*) Fusion Imaging Software developed by TeraRecon, Inc.; pictures and screenshots courtesy by TeraRecon, Inc.

Radiotherapy

SUITESTENSA includes a specific section for managing the activities of a radiotherapy department. SUITESTENSA is able to cover the needs of physicians and radiotherapists during the preparation of treatment planning systems providing:

Radiotherapy EMR:
- Booking and daily observational diary
- Patient plan treatment
- Chemioterapy module and day hospital management
- Patient Follow Up management
- Data aggregation and statistical analysis for reporting department activities
- Connection to record-and-verify systems
- PACS integration

Radiotherapy PACS
- Central Repository for all DICOM treatment data
- Full integration of cone-beam CTs and other simulators, portal images, treatment planning systems
- Compliance with all DICOM RT-related objects: Plan, Struct, Dose, Image etc.
- Integration with LINAC
- Dedicated visualitazion protocols specific for radiotherapy
  - Prefetch and comparison from different modalities and/or previous examinations
  - 3D reconstruction and export of results
  - Visualization of all the DICOM objects and of all the regions of interest

Operating Room

The Operating Room Solution (EORS) is a professional solution for radiological images distribution inside the operating room, to help surgeons with:
- One-touch image display and layout arrangement
- Fast recall of prior examinations and comparison with current studies
- Ergonomic workstations for in-wall/on-wall or portable solutions

Orthopaedics

SUITESTENSA provides best-of-breed software for orthopaedic surgeons with access to an unrivalled library of digital templates for pre-operative planning, operating in four steps: scaling, planning, templating, reporting. (*)

- Joint Replacement
- Fracture Management
- Limb Deformity Correction
- Pediatric Assessment Module
- Spine

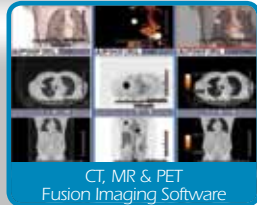*(*) Orthopeadic Software developed by OrthoView LLC; screenshots courtesy by OrthoView LLC.*

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Extend Possibilities

Dedicated to
Radiology
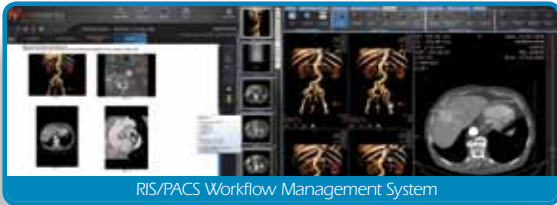
RIS/PACS Workflow Management System
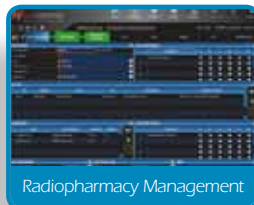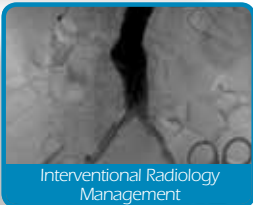
Enterprise Healthcare Network Solutions

CT, MR & PET Fusion Imaging Software

Radiopharmacy Management

Radiotherapy PACS & EMR Management

Interventional Radiology Management

Orthopedics Pre-operative Planning Software

Operating Room Radiological Images Management

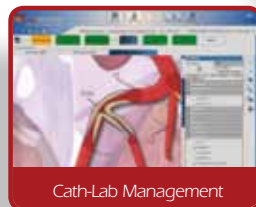2D, 3D & 4D CT, MR & PET Processing Software

Dedicated to
Cardiology

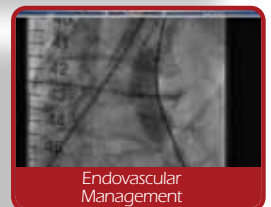Cardiology Imaging and Information Management System
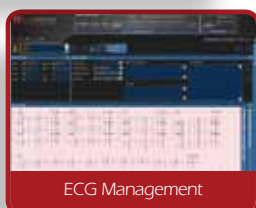
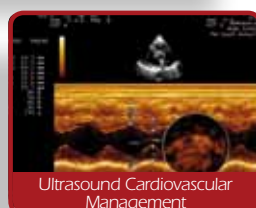Enterprise Healthcare Network Solutions

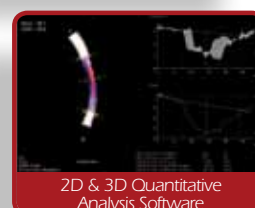Cath-Lab Management

Electrophisiology Management

Endovascular Management

ECG Management

Ultrasound Cardiovascular Management

2D & 3D Quantitative Analysis Software

2D, 3D & 4D Cardiovascular US Processing Software

Esaote

ESAOTE is one of the world's leading producers of medical diagnostic systems. It is well established as a Europe-based leading ultrasound manufacturer, and internationally acknowledged to be the world leader in dedicated MRI. The Esaote Group is also one of the main players in the sector of Information Technology for healthcare.

Headquartered in Italy, Esaote has manufacturing and R&D facilities in Italy, The Netherlands, France and in People's Republica of China. Subsidiaries are present in Holland (Esaote Europe B.V., Maastricht) and in the USA (Biosound Esaote Inc., Indianapolis), Germany (Esaote Biomedica Deutschland GmbH), France (Esaote France sarl), Spain (Esaote España S.A.), China (Esaote China Ltd.), Argentina (Esaote Latinoamerica), India (Esaote Asia Pacific Diagnostic) and Brasil (Esaote Healthcare do Brasil). Representative offices are located also in Moscow (Russia). Through an international distribution network Esaote is present in 60 countries in the world.

In its life Esaote has undergone a steady growth, with a strong contribution of international sales equal to about 60%. Almost 85% of Esaote's consolidated sales are derived from highly competitive markets such as European countries, USA and China.

Today the Esaote Group has about 1350 employees, 40% of which work abroad. The R&D structures employ about 260 qualified technicians (equal to over 20% of total staff) and enjoy the co-operation of international research centres and universities.

ebitAet

EBIT AET - Esaote's Business Unit dedicated to Information Technology - is a leading high-tech software products' manufacturer for medical image and information management.

Ebit Aet takes its birth from more than a decade of experience in the CIS RIS PACS market, of which the last years entirely dedicated to SUITESTENSA's innovative software conception and development. Its software platform suite is specifically designed for Radiology and Cardiology Departments and provides top-line solutions for the rapid and effective implementation of filmless and paperless hospitals.

Thanks to a consolidated know-how in healthcare informatics, Ebit Aet is able to focus on new emerging and challenging diagnostic imaging applications, moving on from consolidated department workflow management toward the widest healthcare geographical enterprise networks.

The result is a leading-edge technology providing a new approach to workflow and anticipating solutions for future incoming requirements.

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