



**Kazeon<sup>®</sup>**

## **Kazeon Support for the Digital Imaging and Communications in Medicine (DICOM) Standard**

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## Background

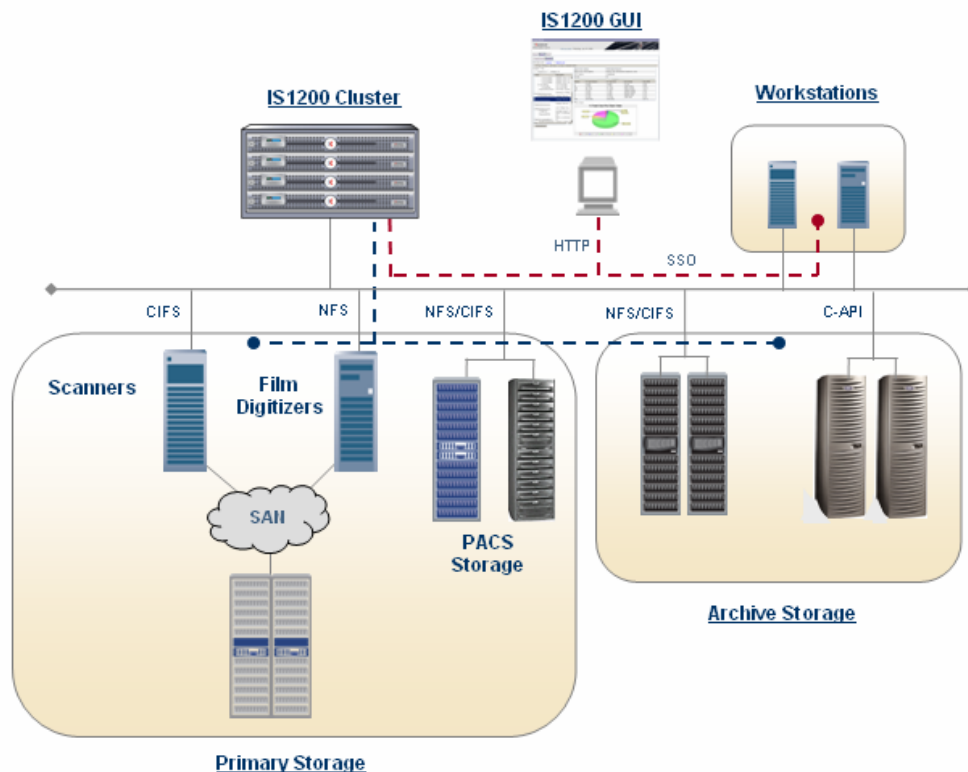
Information governance is a growing issue for most corporations, in particular healthcare organizations, many of which must contend not only with financial regulations such as Sarbanes-Oxley, but also healthcare-focused laws such as HIPAA. The ability to access, search, and secure vital patient information while making it easily available to other healthcare providers is at the forefront of executive's minds.

Healthcare organizations face the challenge of data growth as do many organizations. Patient records, social security numbers and insurance billing information can creep from secure databases onto unsecured networks, increasing risks of fines and customer data exposure.

A fast emerging requirement within healthcare networks is the ability to access information stored in many repositories and devices distributed across a geographically dispersed hospital network. The Digital Imaging and Communications in Medicine (DICOM) standard was created to create consistency such that files can be exchanged between two entities and multiple vendors. However, with files distributed across multiple devices, storage systems, and in different locations there has not been a way for hospital administrators to have a single view into this information.

To help healthcare organizations meet these challenges Kazeon delivers the IS1200-ECS (Enterprise Content System) to ensure that information residing on desktops, networked storage systems, and devices (scanners, film digitizers, etc) can be identified, searched, and managed to improve productivity and minimize exposure. Integrated support for the DICOM standard enables healthcare providers to discover, search and manage files based one or many DICOM file attributes.

The IS1200-ECS integrates into an existing healthcare provider networks and interfaces with existing networked storage and servers to index, search, and manage files in hundreds of file formats and all files that comply with the DICOM standard.



## DICOM

Digital Imaging and Communications in Medicine (DICOM) is a standard for handling, storing, printing, and transmitting information in medical imaging. It includes a file format definition and a network communications protocol. The communication protocol is an application protocol that uses TCP/IP to communicate between systems. DICOM files can be exchanged between two entities that are capable of receiving image and patient data in DICOM format.

DICOM enables the integration of scanners, servers, workstations, printers, and network hardware from multiple vendors into a picture archiving and communication system. The different machines, servers, and workstations come with DICOM conformance statements which clearly state the DICOM classes they support. DICOM has been widely adopted by hospitals and is making inroads in smaller applications like dentists' and doctors' offices.

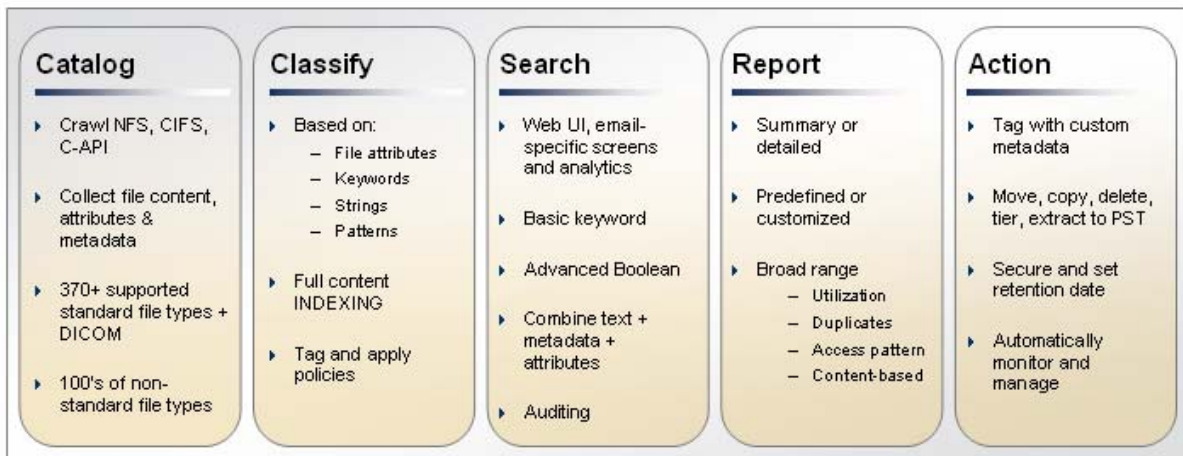
DICOM differs from other data formats in that it groups information together into a data set. That is, an X-Ray of your chest actually contains your patient ID within it, so that the image is never mistakenly separated from your information.

A DICOM data object consist of a number of attributes, containing such items as name, ID etc, and also one special attribute containing the image pixel data (i.e. logically, the main object has no "header" as such - merely a list of attributes, including the pixel data). A single DICOM object can only contain one image, but that image may have multiple "frames", allowing storage of cine loops or other multi-frame data. Image data can be compressed using a variety of standards, including JPEG, JPEG Lossless, JPEG 2000, and Run-length encoding (RLE). LZW (zip) compression could be used for the whole dataset (not just the pixel data) but is rarely implemented.

The same basic format is used for all uses, including network and file usage, but when written to a file, then a true "header" (containing copies of a few key attributes and details of the application which wrote it) is prepended.

## Kazeon Information Management for Healthcare Providers

The IS1200-ECS integrates cataloging, classification, search, and reporting with policy management enabling healthcare providers to automate information management within their network.



## Kazeon Information Management and DICOM Devices

Some common types of DICOM devices include:

- Scanners (CT, MR, CR). Most modern scanners follow the DICOM standard to create, send and print images.
- Film Digitizers/DICOM gateways. Non-DICOM data can be integrated into a DICOM network by scanning film or by using gateways (or black boxes) that convert non-DICOM data into DICOM data.
- Archives. Frequently, a radiology network will have an archive of digital image information. Short-term archives usually use standard Windows or networked storage systems and provide immediate access to recent cases. Long-term archives have historically used tape or optical devices. However, with the economics of storage becoming more attractive many organizations are moving to utilize cost-effective, secondary storage devices for this need.
- Workstations. Filmless institutions will generally have a number of workstations where digital image information can be retrieved and viewed.

## Kazeon Support for the DICOM Standard

Kazeon has added DICOM support so that DICOM files containing hundreds of file attributes can be indexed and searched. This means that hospitals can identify, manage, and search for files scattered across hospital networks based on one or more DICOM attribute.

A list of file attributes that Kazeon supports are:

DICOMTableTopEccentricAxisDistance  
DICOMTableTopEccentricAngle  
DICOMTableTopEccentricRotationDirection  
DICOMTableTopVerticalPosition  
DICOMTableTopLongitudinalPosition  
DICOMTableTopLateralPosition  
DICOMIsocenterPosition  
DICOMSurfaceEntryPoint  
DICOMSourceToSurfaceDistance  
DICOMCumulativeMetersetWeight  
DICOMPatientSetupSequence  
DICOMPatientSetupNumber  
DICOMPatientAdditionalPosition  
DICOMFixationDeviceSequence  
DICOMFixationDeviceType  
DICOMFixationDeviceLabel  
DICOMFixationDeviceDescription  
DICOMFixationDevicePosition  
DICOMShieldingDeviceSequence  
DICOMShieldingDeviceType  
DICOMShieldingDeviceLabel  
DICOMShieldingDeviceDescription  
DICOMShieldingDevicePosition  
DICOMSetupTechnique  
DICOMSetupTechniqueDescription  
DICOMSetupDeviceSequence  
DICOMSetupDeviceType  
DICOMSetupDeviceLabel  
DICOMSetupDeviceDescription

DICOMSetupDeviceParameter  
DICOMSetupReferenceDescription  
DICOMTableTopVerticalSetupDisplacement  
DICOMTableTopLongitudinalSetupDisplacement  
DICOMTableTopLateralSetupDisplacement  
DICOMBrachyTreatmentTechnique  
DICOMBrachyTreatmentType  
DICOMTreatmentMachineSequence  
DICOMSourceSequence  
DICOMSourceNumber  
DICOMSourceType  
DICOMSourceManufacturer  
DICOMActiveSourceDiameter  
DICOMActiveSourceLength  
DICOMSourceEncapsulationNominalThickness  
DICOMSourceEncapsulationNominalTransmission  
DICOMSourceIsotopeName  
DICOMSourceIsotopeHalfLife  
DICOMReferenceAirKermaRate  
DICOMAirKermaRateReferenceDate  
DICOMAirKermaRateReferenceTime  
DICOMApplicationSetupSequence  
DICOMApplicationSetupType  
DICOMApplicationSetupNumber  
DICOMApplicationSetupName  
DICOMApplicationSetupManufacturer  
DICOMTemplateName  
DICOMTemplateType  
DICOMTemplateName  
DICOMTotalReferenceAirKerma  
DICOMBrachyAccessoryDeviceSequence  
DICOMBrachyAccessoryDeviceNumber  
DICOMBrachyAccessoryDeviceID  
DICOMBrachyAccessoryDeviceType  
DICOMBrachyAccessoryDeviceName  
DICOMBrachyAccessoryDeviceNominalThickness  
DICOMBrachyAccessoryDeviceNominalTransmission  
DICOMChannelSequence  
DICOMChannelNumber  
DICOMChannelLength  
DICOMChannelTotalTime  
DICOMSourceMovementType  
DICOMNumberOfPulses  
DICOMPulseRepetitionInterval  
DICOMSourceApplicatorNumber  
DICOMSourceApplicatorID  
DICOMSourceApplicatorType  
DICOMSourceApplicatorName  
DICOMSourceApplicatorLength  
DICOMSourceApplicatorManufacturer  
DICOMSourceApplicatorWallNominalThickness  
DICOMSourceApplicatorWallNominalTransmission  
DICOMSourceApplicatorStepSize  
DICOMTransferTubeNumber

DICOMTransferTubeLength  
DICOMChannelShieldSequence  
DICOMChannelShieldNumber  
DICOMChannelShieldID  
DICOMChannelShieldName  
DICOMChannelShieldNominalThickness  
DICOMChannelShieldNominalTransmission  
DICOMFinalCumulativeTimeWeight  
DICOMBrachyControlPointSequence  
DICOMControlPointRelativePosition  
DICOMControlPoint3DPosition  
DICOMCumulativeTimeWeight  
DICOMReferencedRTPlanSequence  
DICOMReferencedBeamSequence  
DICOMReferencedBeamNumber  
DICOMReferencedReferenceImageNumber  
DICOMStartCumulativeMetersetWeight  
DICOMEndCumulativeMetersetWeight  
DICOMReferencedBrachyApplicationSetupSequence  
DICOMReferencedBrachyApplicationSetupNumber  
DICOMReferencedSourceNumber  
DICOMReferencedFractionGroupSequence  
DICOMReferencedFractionGroupNumber  
DICOMReferencedVerificationImageSequence  
DICOMReferencedReferenceImageSequence  
DICOMReferencedDoseReferenceSequence  
DICOMReferencedDoseReferenceNumber  
DICOMBrachyReferencedDoseReferenceSequence  
DICOMReferencedStructureSetSequence  
DICOMReferencedPatientSetupNumber  
DICOMReferencedDoseSequence  
DICOMReferencedToleranceTableNumber  
DICOMReferencedBolusSequence  
DICOMReferencedWedgeNumber  
DICOMReferencedCompensatorNumber  
DICOMReferencedBlockNumber  
DICOMReferencedControlPointIndex  
DICOMApprovalStatus  
DICOMReviewDate  
DICOMReviewTime  
DICOMReviewerName  
DICOMResultsID  
DICOMResultsIDIssuer  
DICOMReferencedInterpretationSequence  
DICOMInterpretationRecordedDate  
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DICOMDistributionAddress  
DICOMInterpretationID  
DICOMInterpretationIDIssuer  
DICOMInterpretationTypeID  
DICOMInterpretationStatusID  
DICOMImpressions  
DICOMResultsComments  
DICOMPixelDataGroupLength  
DICOMPixelData  
DICOMDataSetTrailingPadding  
DICOMCurveDimensions  
DICOMNumberOfPoints  
DICOMTypeofData  
DICOMCurveDescription  
DICOMAxisUnits  
DICOMAxisLabels  
DICOMDataValueRepresentation  
DICOMMinimumCoordinateValue  
DICOMMaximumCoordinateValue  
DICOMCurveRange  
DICOMCurveDataDescriptor  
DICOMCoordinateStartValue  
DICOMCoordinateStepValue  
DICOMAudioType  
DICOMAudioSampleFormat  
DICOMNumberOfChannels  
DICOMNumberOfSamples  
DICOMSampleRate  
DICOMTotalTime  
DICOMAudioSampleData  
DICOMAudioComments  
DICOMCurveLabel  
DICOMReferencedOverlaySequence  
DICOMReferencedOverlayGroup  
DICOMCurveDataOW  
DICOMOverlayRows  
DICOMOverlayColumns  
DICOMOverlayPlanes  
DICOMNumberOfFramesinOverlay  
DICOMOverlayDescription  
DICOMOverlayType  
DICOMOverlaySubtype  
DICOMOverlayOrigin  
DICOMImageFrameOrigin  
DICOMOverlayPlaneOrigin  
DICOMOverlayBitsAllocated  
DICOMOverlayBitPosition

DICOMROIArea  
DICOMROI Mean  
DICOMROIStandardDeviation  
DICOMOverlayLabel  
DICOMOverlayData

## **Kazeon Solutions for the Healthcare Industry**

A fast emerging requirement within healthcare networks is the ability to access information stored in many repositories and devices distributed across a geographically dispersed hospital network. Kazeon's integrated support for the DICOM standard enables healthcare providers to identify and manage files based on one or many DICOM file attributes.

In addition, Kazeon can help hospitals meet HIPAA and customer privacy requirements. Most healthcare institutions store patient social security numbers, addresses, credit card numbers, insurance data, medical condition, and a lot more. The Kazeon IS1200-ECS system ensures that sensitive, business critical, and confidential information residing on desktops, laptops and healthcare networks is identified and managed resulting in reduced exposure. Through pattern matching and rule-based extraction Kazeon identifies sensitive and confidential data specific to hospital security and data retention requirements

Policies can be created to automate the continuous scanning of file systems at regularly scheduled intervals. This means that files that have changed or have been recently created are automatically examined to identify sensitive and confidential information. Integration with Decru DataFort encryption devices enables Kazeon to identify sensitive information, move it through a Decru device, and store it on secure storage.

To meet HIPAA retention requirements, the IS1200-ECS combined with Retention Manager Software provides organizations with the ability to identify, retain, and secure documents scattered across corporate networks. For the first time healthcare institutions have visibility into files stored in NetApp SnapLock volumes and EMC Centera systems to meet compliance and legal discovery requirements. This visibility provides IT administrators with the knowledge needed to manage files that are due to expire or have met their retention dates. Automation enables IT to migrate files, extend retention dates, and more based on pre-set policies. The integration of reporting and the ability to take action based on report results reduces IT operational costs and simplifies the management of files residing outside and inside of secure storage devices.

With an accurate picture of information assets, healthcare institutions can begin to align data with their storage infrastructure. Projects of high business value can be migrated to secure storage to ensure they will not be accidentally or intentionally deleted. Older projects can be indexed and migrated into an archive. To gain further efficiencies administrators may scan their networks for duplicates, stale data and inappropriate content and delete them prior to migration.

Kazeon helps healthcare providers proactively discover, search, and manage their online information so medical institutions can more productive and minimize corporate risk.