ORACLE
Health

Patient Population EHI Export Data Overview and User Instructions

Patient Population Electronic Health Information (EHI) Export allows for the extraction and export of all patients' EHI from an Office of the National Coordinator for Health IT (ONC)-certified Millennium system in an electronic and computable (machine-processable) format. The patient population export process extracts all data for all patients in the target Millennium system, transforms it where necessary for consumption and data is made available to the organization. This data includes core EHR data stored in a traditional Millennium database along with data created by Millennium applications contained in ancillary storage systems, including multimedia content (e.g., Digital Imaging and Communications in Medicine (DICOM), audio/video, and traditional image files).

The following information provides instructions for consumers of an export to understand and make use of each data set as a complement to the provided data format specification files available in the .zip file titled "Patient Population EHI Export Data Format Specifications" available alongside this document at https://www.oracle.com/health/regulatory/certified-health-it/ and/or included as an appendix in this document. The links directly below may be used to navigate the document.

- Core Millennium EHR Data
- Oracle Health Multimedia Storage Data
    - Appendix A: Oracle Health Multimedia Storage DICOM Data Structure and Definitions
    - Appendix B: Oracle Health Multimedia Storage Non-DICOM Data Column Definitions
- Oracle Health Document Imaging Data
    - Appendix C: Oracle Health Document Imaging Content Management Database Schema
- Oracle Health Longitudinal Plan (One Plan) Data

Core Millennium EHR Data

This component of the export consists of the EHI stored locally in the Millennium EHR database tables. This represents the non-multimedia portion of health records stored in a relational database model. The table and column layouts for the data model are included in the reports contained in the accompanying "EHI ORACLE DATA MODEL" or "EHI MYSQL DATA MODEL" .zip file within the master "Patient Population EHI Export Data Format Specifications" .zip file.

Multi-Tenant Systems

For healthcare organizations whose data is held in shared "multi-tenant" Millennium systems, such as CommunityWorks and Ambulatory ASP customers, core Millennium EHR data will be delivered via SQL files. The data can be accessed by first running the schema/Data Definition Language (DDL) files into an empty MySQL or Oracle database. This creates the tables while the activity and reference SQL files are subsequently uploaded into the database to fill them with rows. Once the database is successfully populated with the exported content, queries can be leveraged to search and process the data as desired. This can be used to map or translate the proprietary data format to other proprietary formats, such as for a third-party destination system.

Single Tenant Systems

For healthcare organizations whose data is held in a non-shared (standalone) "single-tenant" Millennium system, a copy of the full Millennium EHR database will be delivered via a customer-supplied secure

encrypted device to ensure secure handling and transfer of the data.[1] Once the full export process is complete, the device will be physically shipped to a location specified by the customer at which point it can be utilized and processed using the decryption keys as desired.

Organizations should consider the following needs and dependencies for making effective use of the core Millennium EHR data delivered via the secure encrypted hardware:

- The secure encrypted device must be supplied by the customer. Depending on the details of the unique export, specific device options will be recommended as part of the process.
- Additional customer hardware must be setup with Oracle licensed software installed sufficient for the database size. This will be used as the landing place for the content once restored off of the secure encrypted device for local management.
    - More information related to Oracle's backup/restore utility is available in the Oracle® Database Backup and Recovery User Guide.
- Once restored, the database may be queried to retrieve desired data. This can be used to map or translate the proprietary data format to other proprietary formats, such as for a third-party destination system.

Oracle Health Multimedia Storage Data

Multimedia content from Oracle Health Multimedia Storage – including both DICOM and non-DICOM files – is delivered and made available for download in the native format in which they were stored locally (e.g., DICOM, audio files, text files, reports, patient photos, or .pdf). This data will need to be downloaded to a desired locally-hosted location via a unique secure URL provided during the export process. Mapping of the individual multimedia files in the extract to the corresponding data entries in the Millennium EHR database extract can be accomplished using queries supplied as part of the extract. The following information describes the format in which the files are structured and organized when delivered.

Digital Imaging and Communications in Medicine (DICOM) Data

Oracle Health Multimedia Storage DICOM data is organized in a series of tar.gz files containing folders representing patients. The folders are named with the patient's name followed by a unique identifier to handle persons with the same name. Within the directories are .xml or .json files (depending on requested format). There will be a list of files representing the studies for a given patient. These will be named with the DICOM study instance UID for ease of searching. There will also be a file that represents the person data. It will be named the same as the parent folder and can be used to look up person demographic data such as name, patient identifiers, and date of birth.

The detailed data structure and definitions are available in Appendix A of this document, or in the file titled "Oracle Health Multimedia Storage DICOM Data Structure and Definitions" within the .zip file titled "Patient Population EHI Export Data Format Specifications" available alongside this document at https://www.oracle.com/health/regulatory/certified-health-it/. This is hierarchical DICOM data and can be used as search criteria. For pixel data or full DICOM attributes, the file should be retrieved from Storage data using the objectIdentifier from the Instance module.

Non-Digital Imaging and Communications in Medicine (DICOM) Data

Oracle Health Multimedia Storage non-DICOM data is organized in a series of tar.gz files containing .csv files representing the files stored within the system. Files can be extracted using standard tar and GZIP extraction algorithms. The files within are in a standard .csv format.

[1] Note – for organizations who host their own Millennium system on-premises, instructions will be provided for executing a copy self-service mirroring the process executed by Cerner Corporation for hosted environments.

The detailed column definitions for the data are available in Appendix B of this document, or in the file titled "Oracle Health Multimedia Storage Non-DICOM Data Column Definitions" within the .zip file titled "Patient Population EHI Export Data Format Specifications" available alongside this document at https://www.oracle.com/health/regulatory/certified-health-it/. For files with a compression code, the entire file will need to be decompressed. The compression algorithms will be either standard XZ, GZIP or BZIP2. For files with a transformation code, the transformation code indicated the compression used on the pixel data within the file.

For Oracle Health Document Imaging data, these steps should not be followed. The Oracle Health Document Imaging Data section will provide instructions for handling that data. Those files can be identified in the .csv files with a content type value of Enterprise Document Management.

Oracle Health Document Imaging Data

There are two types of documents sourced from the Millennium EHR with possible image content in Oracle Health Document Imaging. The first category is documents from the BLOB_REFERENCE table. The second category are entries from CLINICAL_EVENT with an entry on the CE_BLOB_RESULT table with a STORAGE_CD value equal to the CODE_VALUE from code set 25 with a CDF meaning of OTG (note that the FORMAT_CD value is not used even if populated in this case).

The above documents plus documents not yet posted, such as those currently in the Work Queue Management solution or CDI Batch Indexing application would also be on the CDI_PENDING_DOCUMENT table. However, the index data for in process documents is not known for certain and a decision would have to be made on what to do, if anything, with those images.

In both cases, the BLOB_HANDLE identifies the unique document in Document Imaging. Most BLOB_HANDLE values will be comprised of a string of approximately 40 characters followed by a hash sign and an integer (e.g., #2.00). The string of characters is the BLOB_UID value in the Document Imaging content management database. The integer value (e.g., 2) represents the version of the document in the content management database. Older documents or documents previously migrated from another system may not have a version identifier in which case version 1 is implied.

The content management database is a separate schema from the Millennium EHR. However, it is typically part of the same Oracle database. It is usually identified by the Oracle user of V500_OTG and D_OTG tablespace. If the database is hosted on Microsoft SQL Server, then the export will be separate.

Documents are grouped in the content management database into concepts called applications (AE_APPS table). Each application has a corresponding AE_DT# and AE_DL# table where the appid from AE_APPS is appended to the table name. The AE_DT# table stores information about the documents themselves, while the AE_DL# table stores information about each document's objects, pages, versions, and associated metadata. The applications used by Millennium Platform are identified on the CDI_CM_FOLDER Millennium Platform table, although one could check every AE_DT# table as a BLOB_UID should be unique across all AE_DT# tables.

The BLOB_UID is a column on the AE_DT# table. The specific column name is identified by looking at the AE_ADEFS table. Note that the AE_DT# table may include other fields containing values like patient name, MRN, ENCNTR_NBR, etc. However, those fields are not maintained after initial creation and should not be used. Millennium Platform is the only source of truth for all index fields.

Document revision history is stored on the AE_RH# table. Find a revision of a document by searching AE_DT#.FIELD# for the document's BLOB_UID identifier, then search AE_RH# where AE_RH#.ORGDOCID matches AE_DT#.DOCID and REVNUM matches the desired major revision multiplied by 65536. For example, version 1 is REVNUM 65536, version 2 is REVNUM 131072, and so forth. Each document revision

has a unique docid, except if a document has only a single revision it will not have any rows on AE_RH# table.

Binary\Object File Storage

The location of a physical file (object) is identified by the pathid on the AE_DL# table.

Binary image files (document pages) are preserved in their native format, renamed, and stored as '.bin' files in the write path for the application. Each '.bin' file represents a version of a document page, and each document can have multiple document pages. Therefore, multiple '.bin' files can be linked to each document and stored on the file system. The link between '.bin' files and documents is established in the AE_DT# and AE_DL# tables, based on the 'docid' field.

NOTE: Compressed text files and 'foreign' files will be converted as part of the extraction process. Compressed text files will be uncompressed into individual pages. Foreign files are non-image\proprietary formats like those created by Microsoft Office. All other .bin files are stored in their native format, which can be identified based on the file signature type bytes, such as 0x49 0x49 0x2A 0x00 or 0x4D 0x4D 0x00 0x2A for TIFF, 0xFF 0xD8 0xFF for JPEG, or 0x25 0x50 0x44 0x46 for PDF. Binary compressed text files will begin with type bytes 0x43 0x4F 0x4D 0x31 0x2E 0x30 ("COM1.0"). Binary foreign files will begin with type bytes 0x46 0x46 0x4C 0x31 0x2E 0x30 ("FFL1.0"). The conversion process will create an uncompressed .txt corresponding to any compressed text binary files, and an unencoded .FOREIGN file corresponding to any foreign files.

Binary files are saved with an 8.3 naming convention, with the binary filename being 'objectid'.bin. If the repository exceeds the 8.3 naming convention (object ID characters more than 8), a switch is made to hexadecimal naming. The path is calculated by determining the folder and object level based on the 'objectid', and the filename is calculated based on the hexadecimal value of the 'objectid' and prepended with (A-H).

Below is the structure for document page storage in a Windows file share. Note that the folder structure should remain intact as part of the extract, but the server(s)\share(s) hosting the files will vary slightly depending on where the data is copied and how it is presented.

\\<server>\<share>\<application-name>\<folder-level>\<object-level>\<object>.bin

<server>\<share>: The write path, as defined in the AE_PATHS table, is recorded in the AE_DL# table for each page (as 'pathid'), defining its location on storage.

<application-name>: The name of the content management application containing the document.

<folder-level>: The folder level represents the subfolder within the application folder of the write path. The folder level is calculated based upon objectid as follows:

1. Divide the object ID by 1024 to get the base number.
2. Divide the base number by 1024 again to get the folder level.
3. Take the integer part of the folder level to get the folder number.

Example: For an object ID of 1234567890.

1. 1234567890 / 1024 = 1205722.87109375 (base number).
2. 1205722.87109375 / 1024 = 1177.3618850708 (folder level).
3. The integer part of 1177.3618850708 is 1177, so the folder level is 1177.

<object-level>: The object level represents the subfolder within the folder level of the write path, where the page images (.bin files) are stored. This folder is calculated based upon objectid as follows:

1. Divide the object ID by 1024 to get the base value.
2. Find the remainder of the base value divided by 1024 to get the object level (modulo operation).

3. Divide the base value by 1024 to get the folder level.

Example: For an object ID of 13324.

1. 13324 / 1024 = 13
2. 13 mod 1024 = 13
3. 13 / 1024 = 0

Therefore, the object level is 13 and the folder level is 0. So, the file path for the object ID 13324 would be "\0\13\13324.bin".

<object>.bin: This is the filename for the page object's .bin file in storage. The name of this file changes, based on the following rules:

- .bin files use an 8.3 file naming spec, where the filename is limited to 8 chars.
- If 'objectid' is less 100000000, the binary file takes the name of the 'objectid' (1 ~ 99999999) with appended .bin extension
- If 'objectid' is greater than or equal to 100000000 and less than or equal to 2147483647 (MAX pages for an app), the .bin file will be named in hexadecimal format (HEX: 05F5E100 – 7FFFFFFF)
- To calculate the Filename just add 'A' to the upper nibble. E.g. 7 + 'A' is 'H', 0 + 'A' is 'A', 3 + 'A' is 'D'.

In the case of Oracle Health Multimedia Storage (formerly CareAware MultiMedia Archive), a GroupIdentifier is generated and used to uniquely identify the object in the archive. The GroupIdentifier is the path from AE_PATHS, minus the leading CerOIF:// + the <application-name> + 'objectid' + bin, and any characters considered unsafe characters for URL encoding are converted to hexadecimal and surrounded by "<" and ">". For example, underscore "_" is replaced with "<5F>". The GroupIdentifier is then found in the .csv file generated by Multimedia Storage during the extract process and the corresponding S3Path in the .csv file is the S3 object key for the physical file in the S3 bucket.

For example, a full path of CerOIF://CERN_MO@BUILD@CAMM1/CDI_AUTO\0\292\299833.bin results in a GroupIdentifier of CERN<5F>MO@BUILD@CAMM1CDI<5F>AUTO299833bin

Below are example storage paths for a CEROTG application following this specification:

For object ID 20:

Filename: 20.bin

Folder level: 0

Object level: 0

Full Windows path: \\server\share\CEROTG\0\0\20.bin

GroupIdentifier: CERN<5F>MO@BUILD@CAMM1CEROTG20bin

For object ID 357:

Filename: 357.bin

Folder level: 0

Object level: 0

Full path: \\server\share\CEROTG\0\0\357.bin

GroupIdentifier: CERN<5F>MO@BUILD@CAMM1CEROTG357bin

For object ID 5000:

Filename: 5000.bin

Folder level: 0

Object level: 4

Full path: \\server\share\CEROTG\0\4\5000.bin

GroupIdentifier: CERN<5F>MO@BUILD@CAMM1CEROTG5000bin

For object ID 1350030:

Filename: 1350030.bin

Folder level: 1

Object level: 294

Full path: \\server\share\CEROTG\1\294\1350030.bin

GroupIdentifier: CERN<5F>MO@BUILD@CAMM1CEROTG1350030bin

For object ID 2147483647:

Filename: HFFFFFFF.bin

Folder level: 2047

Object level: 1023

Full path: \server\share\CEROTG\2047\1023\HFFFFFFF.bin

GroupIdentifier: CERN<5F>MO@BUILD@CAMM1CEROTGHFFFFFFFbin

For object ID 1000000001:

Filename: DB9ACA01.bin

Folder level: 953

Object level: 690

Full path: \server\share\CEROTG\953\690\DB9ACA01.bin

GroupIdentifier: CERN<5F>MO@BUILD@CAMM1CEROTGDB9ACA01bin

Form Overlays

Text files can be configured to be overlayed on a form template (referred to as a form overlay). For uncompressed text files, the overlay's name is embedded with the text file. If compressed text content is set to display on a form overlay document, a .csv file will also be generated corresponding to the compressed text file, containing the page number and the form overlay name to be used for that page.

Overlay names map to a document in the _FORMS application (AE_APPS table). Information about the image file and overlay settings are stored on the corresponding AE_DL# and AE_DT# tables respectively.

Annotation Files

The annotation file path is calculated based on the following specifications:

- The annotation filename follows the format "pp000000.ext", all in base 32.
- "pp" represents the PathId of the object
- "000000" represents the ObjectId of the object
- For the extension:
    - If SubPageNum = 0, the extension is ".ano".
    - If SubPageNum > 0, the extension is base 32 encoded SubPageNum value.

Annotation files stored in Multimedia Storage result in a similar GroupIdentifier, just using the annotation filename and extension at the end of the path versus the 'objected' + bin. For example, CERN<5F>MO@BUILD@CAMM1CEROTG01000020ano for an annotation file associated to .bin file 20 stored to PATH_ID = 1 with SubPageNum = 0.

Converted Annotation Files

Annotation files will be converted to .xml files, out of the proprietary format. The specifications of the resulting .xml file are documented in the .xml Schema Definition (XSD) file titled "Oracle Health Document Imaging AxAnnotations" within the master "Patient Population EHI Export Data Format Specifications" .zip file available alongside this document at https://www.oracle.com/health/regulatory/certified-health-it/. Annotation files will contain one or more annotation objects, of various types such as text, rectangle ("rect"), highlighter, or line. Annotation positions are given in pixels from the top and left of raster images. For .pdf pages, if the page contains an image with resolution greater than 72dpi, the annotation position is given in pixels from the top and left of the page; if the .pdf page does not contain an image or the resolution is not greater than 72dpi, the annotation position is given in points (1/72 of an inch) from the top and left of the page.

On Demand OCR Text Files

If a user initiates an on-demand request to OCR a page, the resulting text file is stored in a .tx file with the same name as the object. For example, 145.bin would have text stored as 145.tx. However, if the object has subpages, then the same logic as an annotation file documented above is used, however instead of the pathid being base32 encoded at the start of the filename (pp value), a designator of Y0 is used. Note that very few pages will be OCR'd. Oracle Health suggests that the destination system leverage its own OCR capabilities to regenerate any data necessary or desired.

Extraneous Data

It is expected that the content management database and filesystem will have data not referenced in Millennium. This is expected behavior across various workflows. For example, a document could be submitted to the Millennium Platform but then fails validation and a user then marks the document as deleted in the manual correction application. The delete action is just an update to the Millennium database with no impact to the content management components.

Content Management Database Schema

The tables necessary to understand document composition are available in Appendix C of this document, or in the file titled "Oracle Health Document Imaging Content Management Database Schema" within the .zip file titled "Patient Population EHI Export Data Format Specifications" available alongside this document at https://www.oracle.com/health/regulatory/certified-health-it/. The content management database extract will include other tables that are either not used by Document Imaging or that are not part of document composition (e.g., tables related to content management users).

Oracle Health Longitudinal Plan (One Plan) Data

Patient care planning content from the One Plan (Longitudinal Plan) data source – including health concerns, goals, activities, strengths, and care plans – is delivered as .CSV files in the format specified in the accompanying "Longitudinal Plan EHI Export – Patient Population" .pdf file.

Once extracted as part of the full EHI Export, patient care planning content from the One Plan (Longitudinal Plan) data source is able to be downloaded directly via requests to the public HealtheIntent Data Syndication APIs. If desired, the data can also be sent to an existing AWS cloud storage location specified by the customer.

Appendix A: Oracle Health Multimedia Storage DICOM Data Structure and Definitions

Data Structure

This is a sample of the person .XML that can be generated:

```
<?xml version="1.0"?>
<person:person xmlns:person="com.cerner.mmf.cps.person.biz">
        <person:uid>urn:cerner:mid:cps.dicom.person:cps_dicom-ro:123</person:uid>
        <person:sexCode>FEMALE</person:sexCode>
        <person:ethnicGroup>Black</person:ethnicGroup>
        <person:identifiers>
                <person:personIdentifier>
                        <person:uid>urn:cerner:mid:cps.dicom.person.identifier:cps_dicom-
ro:124</person:uid>
                        <person:identifier>abc123</person:identifier>
                        <person:assigningAuthority>cerner</person:assigningAuthority>
                        <person:localAssigningAuthority/>
                </person:personIdentifier>
        </person:identifiers>
        <person:names>
                <person:personName>
                        <dicom_common:uid
xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common">urn:cerner:mid:cps.dicom.person.name.group
:cps_dicom-ro:125</dicom_common:uid>
                        <dicom_common:alphabetic
xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common">
                                <dicom_common:last>LNANE</dicom_common:last>
                                <dicom_common:first>FNAME</dicom_common:first>
                                <dicom_common:middle>MNAME</dicom_common:middle>
                                <dicom_common:prefix>MR</dicom_common:prefix>
                                <dicom_common:suffix>JR</dicom_common:suffix>
                        </dicom_common:alphabetic>
                        <dicom_common:phonetic
xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>
                        <dicom_common:ideographic
xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>
                </person:personName>
        </person:names>
```


<person:tenantIdentifier>tenant_ident</person:tenantIdentifier>

<person:beginEffectiveDate>2022-12-01T08:18:02.962Z</person:beginEffectiveDate>

<person:revisionNumber>1683040815862538</person:revisionNumber>

<person:socialBirthdate>19700101</person:socialBirthdate>

<person:birthdate>

<dicom_common:dateTime xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common">1970-01-01T06:00:00Z</dicom_common:dateTime>

<dicom_common:precisionFlag xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common">DAY</dicom_common:precisionFlag>

<dicom_common:timezone xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common">America/Chicago</dicom_common:timezone>

</person:birthdate>

<cps-common:context xmlns:cps-common="com.cerner.mmf.cps.common">

<cps-common:application>DICOM_SERVICE</cps-common:application>

<cps-common:authenticatedConsumer>authenticated_consumer</cps-common:authenticatedConsumer>

<cps-common:principalName>0000.0000.00D9.0ADC@tenant_ident</cps-common:principalName>

<cps-common:remoteHost>111.111.111.111</cps-common:remoteHost>

<cps-common:systemHost>hostname.domain.net</cps-common:systemHost>

</cps-common:context>

<person:systemTimestamp>2023-05-02T10:20:15.861Z</person:systemTimestamp>

</person:person>

This is a sample of the study data that can be generated:

<?xml version="1.0"?>

<dicom:study xmlns:dicom="com.cerner.mmf.cps.dicom.biz">

<dicom:uid>urn:cerner:mid:cps.dicom.study:cps_dicom-ro:7169730606773907334</dicom:uid>

<dicom:patientIdentifier>

<dicom:personUID>urn:cerner:mid:cps.dicom.person:cps_dicom-ro:68454714336036504O</dicom:personUID>

<dicom:personIdentifierUID/>

<dicom:personNameUID>urn:cerner:mid:cps.dicom.person.name.group:cps_dicom-ro:684547143360365041</dicom:personNameUID>

</dicom:patientIdentifier>

<dicom:tenantIdentifier>2e3bfff6-5b5b-4474-9058-caff792dbefa</dicom:tenantIdentifier>

<dicom:studyInstanceUID>1.2.840.113970.1.2.840.10008.2052574.20230119.1041257</dicom:studyInstanceUID>

<dicom:studyIdentifier>20150925161744</dicom:studyIdentifier>

<dicom:studyDate>

<dicom_common:dateTime xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common">2023-01-19T21:39:53.081Z</dicom_common:dateTime>

<dicom_common:precisionFlag xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

</dicom:studyDate>

<dicom:accessionNumber>

<dicom_common:identifier xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common">CV-23-0000001</dicom_common:identifier>

<dicom_common:issuer xmlns:dicom_common="com.cerner.mmf.cps.dicom.biz.common">

<dicom_common:localNamespaceEnitityId>HNA_ACCN</dicom_common:localNamespaceEnitityId>

<dicom_common:universalEntityId xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

<dicom_common:universalEntityIdType xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

</dicom_common:issuer>

</dicom:accessionNumber>

<dicom:description>TOUCH ECG-12 LEAD</dicom:description>

<dicom:statusCode xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

<dicom:scheduledStartDate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

<dicom:arrivalDate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

<dicom:completionDate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

<dicom:verifiedDate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

<dicom:readDate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>

<dicom:studyTimeZone>America/Chicago</dicom:studyTimeZone>

<dicom:placerOrderNumber>pon</dicom:placerOrderNumber>

<dicom:fillerOrderNumber>fon</dicom:fillerOrderNumber>

<dicom:requestedProcedureIdentifier>TOUCH ECG-12 LEAD</dicom:requestedProcedureIdentifier>

<dicom:requestedProcedureDescription>TOUCH ECG-12 LEAD</dicom:requestedProcedureDescription>

<dicom:procedurePlacerOrderNumber>ppon</dicom:procedurePlacerOrderNumber>

<dicom:procedureFillerOrderNumber>pfon</dicom:procedureFillerOrderNumber>


```
<dicom:scheduledProcedureStepIdentifier/>
<dicom:scheduledProcedureStepDescription/>
<dicom:validationStatusCode>VALIDATED</dicom:validationStatusCode>
<dicom:customStatus/>
<dicom:locked>false</dicom:locked>
<dicom:lockConsumerIdentifier/>
<dicom:lockDate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>
<dicom:revisionNumber>1674145330313416</dicom:revisionNumber>
<dicom:idleIndicator>true</dicom:idleIndicator>
<dicom:origin>host.net</dicom:origin>
<dicom:beginEffectiveDate>2023-01-19T10:21:03.693Z</dicom:beginEffectiveDate>
<dicom:systemTimestamp>2023-01-19T10:22:10.308Z</dicom:systemTimestamp>
<cps-common:context xmlns:cps-common="com.cerner.mmf.cps.common">
        <cps-common:application>ASYNC_ENGINE</cps-common:application>
        <cps-common:authenticatedConsumer/>
        <cps-common:principalName/>
        <cps-common:remoteHost/>
        <cps-common:systemHost>internal-CAMM7-Integration-DICOM-480730653.us-east-
2.elb.amazonaws.com</cps-common:systemHost>
</cps-common:context>
<dicom:admittingDiagnoses>
        <dicom:admittingDiagnosis>diagnosis1</dicom:admittingDiagnosis>
</dicom:admittingDiagnoses>
<dicom:referringPhysicianName xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>
<dicom:physicianOfRecordNames/>
<dicom:requestingPhysicianName xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"/>
<dicom:readingPhysicianNames/>
<dicom:modalitiesInStudy>
        <dicom:modalityCode>ECG</dicom:modalityCode>
</dicom:modalitiesInStudy>
<dicom:numberOfSeries>1</dicom:numberOfSeries>
<dicom:numberOfInstances>1</dicom:numberOfInstances>
<dicom:seriesList>
        <dicom:series>
                <dicom:uid>urn:cerner:mid:cps.dicom.series:cps_dicom-
ro:7169730606774050900</dicom:uid>
```


<dicom:studyUID>urn:cerner:mid:cps.dicom.study:cps_dicom-ro:7169730606773907334</dicom:studyUID>

<dicom:seriesInstanceUID>2.16.840.1.113669.632.2.6529916508793187069.1924951626599294367</dicom:seriesInstanceUID>

<dicom:instances>

<dicom:instance>

<dicom:instanceType>WAVEFORM</dicom:instanceType>

<dicom:uid>urn:cerner:mid:cps.dicom.instance:cps_dicom-ro:7169730606803254951</dicom:uid>

<dicom:objectIdentifier>d2b3137b-2dd7-441a-9aa9-e47a360caae2</dicom:objectIdentifier>

<dicom:tenantIdentifier>2e3bfff6-5b5b-4474-9058-caff792dbefa</dicom:tenantIdentifier>

<dicom:seriesUID>urn:cerner:mid:cps.dicom.series:cps_dicom-ro:7169730606774050900</dicom:seriesUID>

<dicom:sopClassUID>1.2.840.10008.5.1.4.1.1.9.1.1</dicom:sopClassUID>

<dicom:sopInstanceUID>2.16.840.1.113669.632.2.7489303512934581522.7395507619612034518</dicom:sopInstanceUID>

</dicom:instance>

</dicom:instances>

</dicom:series>

</dicom:seriesList>

</dicom:study>

Data Definitions

Field	Module	DICOM Tag	Notes
UID	Person		System generated unique identifier for the person
sexCode	Person	(0010,0040)	
ethnicGroup	Person	(0010,2160)	
identifier	Person Identifier	(0010,0020)	Identifier of the person
assigningAuthority	Person Identifier	(0010,0021) or (0010,0021)	Assigning authority for the identifier
localAssigningAuthority	Person Identifier	(0010,0021) or (0010,0021)	Assigning authority for the identifier
last	Person Name	(0010,0010)	
first	Person Name	(0010,0010)	

middle	Person Name	(0010,0010)	
prefix	Person Name	(0010,0010)	
suffix	Person Name	(0010,0010)	
tenantIdentifier	Person		Unique identifier for the tenant
beginEffectiveDate	Person		System timestamp when study was last significantly changed
revisionNumber	Person		The current revision number of the person. Is changed every time the row is modified.
socialBirthdate	Person	(0010,0030) and (0010,0032)	This is the person birthdate as a social construct
dateTime	birthdate	(0010,0030) and (0010,0032)	This is the person birthdate as a UTC point in time
precisionFlag	birthdate		This indicates the precision of the date
timezone	birthdate		The time zone that the birthdate was interpreted in
application	context		The last application to modify the person record
authenticatedConsumer	context		the consumer key used to make the last modification
principalName	context		The user principal that made the last update
remoteHost	context		The remote host where the last update came from
systemHost	context		The host where the last modification was received
systemTimestamp	Person		System timestamp when person was last changed at all
	Person		
uid	Study		System generated unique identifier for the study
personUID	patientIdentifier		System generated unique identifier for the person
personIdentifierUID	patientIdentifier		System generated unique identifier for the person identifier
personNameUID	patientIdentifier		System generated unique identifier for the person name
tenantIdentifier	Study		Unique identifier for the tenant
studyInstanceUID	Study	(0020,000D)	
studyIdentifier	Study	(0020,0010)	
dateTime	studyDate	(0008,0020) and (0008,0030)	Date of the study in UTC
precisionFlag	studyDate		This indicates the precision of the date
identifier	accessionNumber	(0008,0050)	
localNamespaceEnitityId	issuer	(0040,0031)	
universalEntityId	issuer	(0040,0032)	
universalEntityIdType	issuer	(0040,0033)	

description	Study	(0008,1030)	
statusCode	Study	(0032,000A)	
scheduledStartDate	Study	(0032,1000) and (0032,1001)	
arrivalDate	Study	(0032,1040) and (0032,1041)	
completionDate	Study	(0032,1050) and (0032,1051)	
verifiedDate	Study	(0032,0032) and (0032,0033)	
readDate	Study	(0032,0034) and (0032,0035)	
studyTimeZone	Study		Time zone that the study dates were interpreted in.
placerOrderNumber	Study	(0040,2016)	
fillerOrderNumber	Study	(0040,2017)	
requestedProcedureIdentifier	Study	(0040,1001)	
requestedProcedureDescription	Study	(0032,1060)	
procedurePlacerOrderNumber	Study	(0040,1006)	
procedureFillerOrderNumber	Study	(0040,1007)	
scheduledProcedureStepIdentifier	Study	(0040,0009)	
scheduledProcedureStepDescription	Study	(0040,0007)	
validationStatusCode	Study		Validation status of the study. If a study is validated, this means that it was updated with current demographic data from Millennium. Anything else means that it has not been validated.
customStatus	Study		Not used
locked	Study		Not used
lockConsumerIdentifier	Study		Not used
lockDate	Study		Not used
revisionNumber	Study		The current revision number of the study. Is changed every time the row is modified.
idleIndicator	Study		Study idle means that there has been no activity for the study for the past 30 seconds. Busy means that the study was being altered.
origin	Study		Host where the study was announced to
beginEffectiveDate	Study		System timestamp when study was last significantly changed
systemTimestamp	Study		System timestamp when study was last changed at all

admittingDiagnosis	admittingDiagnoses	(0008,1080)	
referringPhysicianName	Study	(0008, 0090)	
physicianOfRecordNames	Study	(0008,1048)	
requestingPhysicianName	Study	(0032,1032)	
readingPhysicianNames	Study	(0008,1060)	
modalitiesInStudy	Study	(0008,0061)	
numberOfSeries	Study	(0020,1206)	
numberOfInstances	Study	(0020,1208)	
uid	Series		System generated unique identifier for the series
studyUID	Series		System generated unique identifier for the study
seriesInstanceUID	Series	(0020, 000E)	
instanceType	Instance		
uid	Instance		System generated unique identifier for the instance
objectIdentifier	Instance		Identifier for the content stored within the storage system
tenantIdentifier	Instance		Unique identifier for the tenant
seriesUID	Instance		System generated unique identifier for the series
sopClassUID	Instance	(0008,0016)	
sopInstanceUID	Instance	(0008,0018)	

Appendix B: Oracle Health Multimedia Storage Non-DICOM Data Column Definitions

Column	Definition
ObjectIdentifier	Unique identifier for the given object
CompressionCode	Compression algorithm used for the file
GroupIdentifier	The grouping identifier for the object
MimeTypeCode	Mime type of the file
OrigStoredTimeStamp	The timestamp when the file was stored to the system.
S3Path	The path in S3 where the file is located
SourceName	The name of the source that originally contributed the file.
TransformationCode	Transformation code used for DICOM files

Appendix C: Oracle Health Document Imaging Content Management Database Schema

AE_ADEFS

The AE_ADEFS table contains the field definitions for each application created in the specified data source.

Column name	Data Type	Size	Description
appid	smallint	2	application id
colnum	smallint	2	application field number
coldesc	varchar	64	application field description
colwidth	smallint	2	width of data type
datatypeid	smallint	2	Data type id of this application field
subid	smallint	2	sub id for field type
required	smallint	2	required flag (0=not required, 1=required)
readonly	smallint	2	read-only flag (0=not read only, 1=read only)
flags	smallint	2	flag settings for a field
colname	varchar	64	database column name used
listtable	varchar	32	list-user defined table name
editpic	varchar	254	field validation mask

flags	Description
0x0001	Field is searchable
0x0002	Document Level security field
0x0004	Auto-index field
0x0008	Part of unique key
0x0010	Field value required; cannot be null
0x0020	Read-only field
0x0040	Reference key field
0x0080	Reference data field
0x0100	Dual data entry
0x0200	Value mask

AE_APPS

The AE_APPS table contains the application definition for each application created in the specified data source.

Column name	Data Type	Size	Description
appid	smallint	2	application id
appname	varchar	64	application name
appdesc	varchar	128	application description
dtname	varchar	32	document (DT) table name
dlname	varchar	32	document (DL) page table name
tsstamp	varchar	19	timestamp for application creation
flags	int	4	application flag settings
pathid	smallint	2	current path id for the object files
annpath	smallint	2	current path id for the annotation files
txtpath	smallint	2	current path id for the OCR text
ftpath	smallint	2	ProIndex full-text database file path.
rfname	varchar	32	Key reference (RF) table name
ftsvrid	int	4	Verity K2 server id. The server settings are located in AE_SVRLST table.
ftcolname	varchar	64	ftcolname column is Verity full-text collection name.
sdname	varchar	40	Centera cluster name when using Centera
sdcercid	varchar	82	Certificate file's clip id when using Centera

Flags

flag	Description
0x00001	Multiple indexes per document
0x00002	App has Document Level security
0x00004	App has auto-index fields
0x00008	App contains key reference fields
0x00010	App has unique index
0x00020	App use cluster index
0x00040	Can delete/purge application
0x00080	Prompt for checkout before opening document
0x00100	Must provide checkout comment
0x00200	Must provide check in comment

0x00400	(reserved)
0x00800	Document signing has been turned on
0x01000	application supports document retention administration
0x02000	application supports records management classify and transfer
0x04000	application supports Centera storage device
0x08000	(reserved)
0x10000	application supports Software retention
0x20000	application supports EDB Events

AE_CFG

The AE_CFG table contains system configuration information including the latest content management version being run on the current data source.

Column Name	Data Type	Size	Description
cfgid	smallint	2	configuration id
cfgvalue	varchar	128	configuration value

cfgid	Description	Sample Value
1	Database version	4.20.18
2	Simultaneous users.	255
3	last assigned workstation id	4
4	creator user name.	
5	last used print job id	1
6	path semaphore.	
7	last archive id. Used by Archive Wizard	1
8	data types. Used by ver 3.x only.	VERSION 3.2
9	Authoring software for the database	
22	machine name of License Server	
23	Local number	
24	COLD report id	1
25	License Server 5.00 RPC Info	
26	License Server 5.00 Group Name	
27	Read-Only repository indicator	

30	Security provider 1- CM Security; 2- Windows Security; 3- EAI Security; 5- Directory (LDAP) Security For SCT integration which uses EAI security, the value is 'OtgSctHk.ExtSec'.	1
31	Last assigned user id	2
32	Last assigned group id (reserved)	
33	Last annotation group id	1
35	The unique id for global UDL	
100	last global id for queues	1
101	last queue id	1
102	last job id	1
103	Last batch class id	1
104	Query Pre-Execution Hook	
105	Document Object Creation Hook	
106	Document Object Index Hook	
107	Document Object Delete Hook	
108	Disable autoindex (AI) delete from AI dialog 0x00 - Normal AI operation (delete entry after use) 0x01 - Hide delete button 0x02 - Hide delete all button 0x04 - Hide select button 0x08 - leave entry 0x10 - auto-index fields are read-only during document index The value should be encoded as hex decimal, so to "Hide delete button' and make 'auto-index fields read-only' the value should be '11'.	1F
109	This string contains CM feature codes Show underscore application	1
110	Security provider setting in XSAdmin: 1- CM Security; 2- Windows Security; 3- EAI Security; 5- Directory (LDAP) This value should be the same as the value defined in cfgid 30	
111	Generated unique database identifier	GUID
112	AppGen Import User hook; works with CM Security only	
1000~1255	Reserved for audit	

AE_CO

The AE_CO table contains document check out information.

Column Name	Data Type	Size	Description

appid	smallint	2	application id
docid	int	4	document id which was checked out
orgdocid	int	4	document id of initial revision
revdocid	int	4	document id reserved for check-in later
revnum	int	4	revision number of checked out document
usrid	int	4	user id who checked out the document
wsname	varchar	250	Workstation name
checkoutby	varchar	64	user who checked out the document
checkoutdt	varchar	20	checkout timestamp
cocomment	varchar	254	checkout comment

AE_DL#

The AE_DL# table contains the page pointers to images for each page in an application.

Column Name	Data Type	Size	Description
docid	int	4	document id
pagenum	int	4	page number of document
subpagenum	smallint	2	sub page number of document
pagever	tinyint	1	page version
objectid	int	4	object id
pathid	smallint	2	path id for the object file
annote	smallint	2	path id for the annotations file
formatid	int	4	ODMA client app id defined in ae_cfmt
annoteid	int	4	annotation id
data1	int	4	path id for the OCR file
data2	int	4	Not used
data3	int	4	Not used
ftoffset	int	4	Full-text offset
ftcount	int	4	Full-text page count

AE_DT#

The AE_DT# table contains the index data for images in a particular application.

Column Name	Data Type	Size	Description
field(n)	variable	variable	application field

docid	int	4	document id
numobjects	int	4	number of objects in a document
iscom	tinyint	1	Bitmap set to one or more of the values described in table below
idxid	smallint	2	Index id
modts	timestamp	8	Modified time stamp
ftts	timestamp	8	Full texted time stamp
deleteUsrId	int	4	UserId of the user who inserted the Document into RecycleBin. This column will only be added, if the particular Application is enabled for the RecycleBin.

Iscom	Description
0x01	(reserved)
0x02	The document can only be accessed through Workflow integration.
0x04	Document is versioned.
0x08	Reserved for checkin – Document is on Retention
0x10	Document is being checked out
0x20	Document is on retention hold
0x40	Previous revision indicator
0x80	Document is the working revision

AE_PATHS

The AE_PATHS table stores all valid path information for the specified data source.

Column Name	Data Type	Size	Description
pathid	smallint	2	path id
path	varchar	250	file path

AE_RH#

The AE_RH# tables contains revision history of documents.

Column name	Data Type	Size	Description
docid	int	4	document id
orgdocid	int	4	document id of initial revision
revnum	int	4	document revision number

checkinby	varchar	64	user who checkin the document
checkindt	varchar	20	check in timestamp
cicomment	varchar	254	checkin comment
deleteUsrId	int	4	UserId of the user who inserted the Document into RecycleBin. This column will only be added, if the particular Application is enabled for the RecycleBin.

CM_CONFIG

The CM_CONFIG table stores the definitions of CM configuration.

Column Name	Data Type	Size	Description
idname	varchar	200	Configuration name
seqnum	smallint	2	Segment sequence number
datastream	varchar	1024	Configuration data
ts	timestamp	8	timestamp

