

# MINUTES

**MEETING NAME** 09-WG33: WG-33 Data Archive and Management

**MEETING PLACE/DIAL IN**

**DATE & TIME** Wednesday, March 3, 2021 | 11:00 am – 12:30 pm US ET

**PRESIDING OFFICERS** Matthew Bishop, UnityPoint Health  
 Keith Eklund, Healthcare Tech Solutions

**VOTING MEMBERS PRESENT**

Argentix Informatix	Silver, Elliot
DesAcc EMEA	King, Graham
Healthcare Tech Solutions	Eklund, Keith
Laitek, Inc.	Brown, Barry
Laitek, Inc.	Costea-Barluti, Razvan
Laitek, Inc.	Solomon, Harry
Society for Imaging Informatics In Medicine	Bishop, Matthew
Society for Imaging Informatics In Medicine	Carey, Cheryl

**OTHERS**

Citius Tech Healthcare Technology	Mahalle, Prashant
Laitek, Inc.	Behlen, Fred
Mega Informatica Ltd	Fauquex, Jacques
TFT	Bagheri, Majid

**VOTING MEMBERS ABSENT**

AAPM	Bevins, Nicholas
ACR	Maldonado, Josh
Ambra Health	Ostrow, Daniel
Canon Medical Research USA	O'Donnell, Kevin
Canon/Vital Images	Dawson, Tim

Canon/Vital Images	Whitby, Jonathan
Change Healthcare	Ho, Kinson
European Society of Radiology	Mildenberger, Peter
GE Healthcare	Nichols, Steven
GE Healthcare	Numan, Jouke
Grafimedia	Georgiadis, Pantelis
Mach7 Technologies	Ulanov, Alexey
Mayo Clinic Rochester	Persons, Kenneth
PixelMed Publishing	Clunie, David
Society for Imaging Informatics In Medicine	Henson, Kyle
Varian Medical Systems, Inc.	Schwere, Thomas

**DICOM** Anna Zawacki, SIIM  
**SECRETARIAT**

**1 CALL TO ORDER AND REVIEW OF ANTI-TRUST RULES AND DICOM PATENT POLICY (Co-Chairs, Secretariat)**

The meeting was called to order. Guidelines for Conducting NEMA Meetings were read and attendance was recorded.

**2 REVIEW AND APPROVE AGENDA (Co-Chairs)**

The agenda was reviewed.

**3 REVIEW MINUTES (Co-Chairs)**

The minutes of the previous meeting were reviewed.

**4 TOPIC ITEMS TO BE DISCUSSED (All)**

- Review Draft#20 of Supplement# 223

[ftp://medical.nema.org/MEDICAL/Private/Dicom/WORKGRPS/WG33/2021/2021-03-03/Sup223\\_20\\_InventoryIODandServices.docx](ftp://medical.nema.org/MEDICAL/Private/Dicom/WORKGRPS/WG33/2021/2021-03-03/Sup223_20_InventoryIODandServices.docx)

- Line by line read through of Part 17 Informative Annex (substantial new section - specifies links to Inventory SOP Instances included by reference per last meeting's decision)

## Inventory Content by Reference

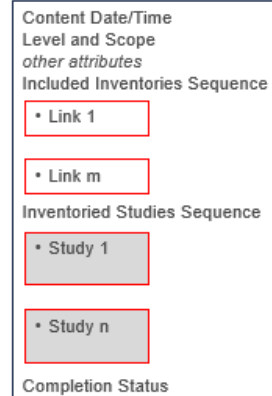
Inventory object includes:

- Content Date/Time (Date/Time of inventory initiation)
- Level and Scope of Inventory
- **Links to other inventory objects included by reference, and/or**
- **Studies Inventory**
- Completion status (with respect to Scope of Inventory at Content Date/Time)

Linked objects form a tree from a root object

- Root specifies Content Date/Time, Scope of Inventory, and Completion status for tree
- Those attributes in non-root objects ignored (but are valid for their subtree)

Pre-existing inventory objects can be linked – may appear under multiple roots



Inventory objects include studies of inventory.

Object will have a completion status with respect to its scope of inventory at its content date/time.

Link from one object to another and have a tree with a root.

Since you are including the subsidiary content by reference it's as if they were in the object logically, so the completion status and the scope of inventory and content date/time is for the object and anything it includes.

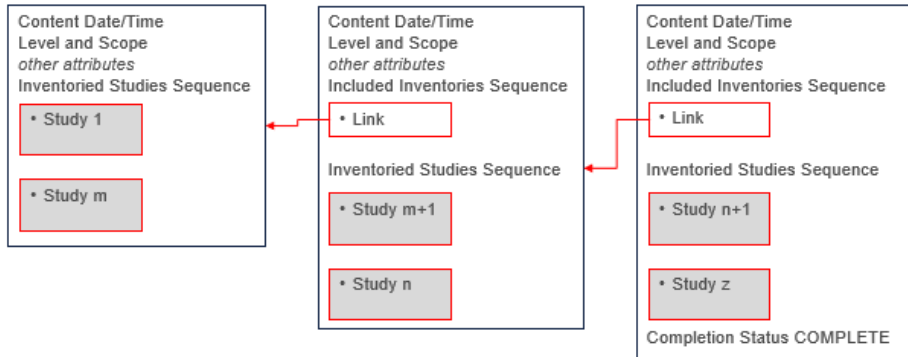
If you have those attributes in subsidiary, you are just ignoring them.

Every object specifies its attributes for itself and its tree.

Does it imply a hierarchy – applies transitivity of these inventory attributes to the total set of studies that are in the tree.

First case:

## Example Approach: Serial Production



**Objects filled with inventoried studies until max size, next object links to prior, last becomes root**

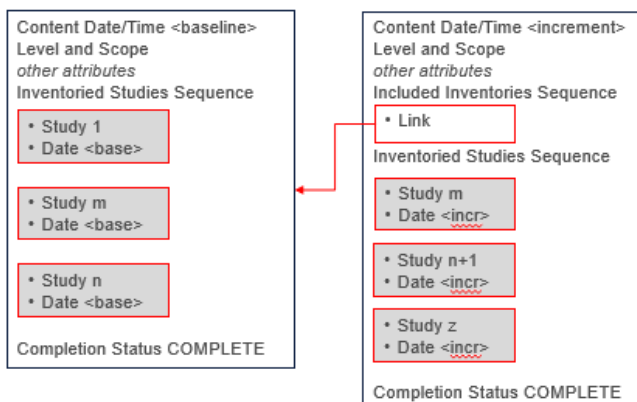
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We are considering the producing of this inventory as one operation?  
Yes in this case it is – first example

Next case:

## Example Approach: Baseline and incremental update



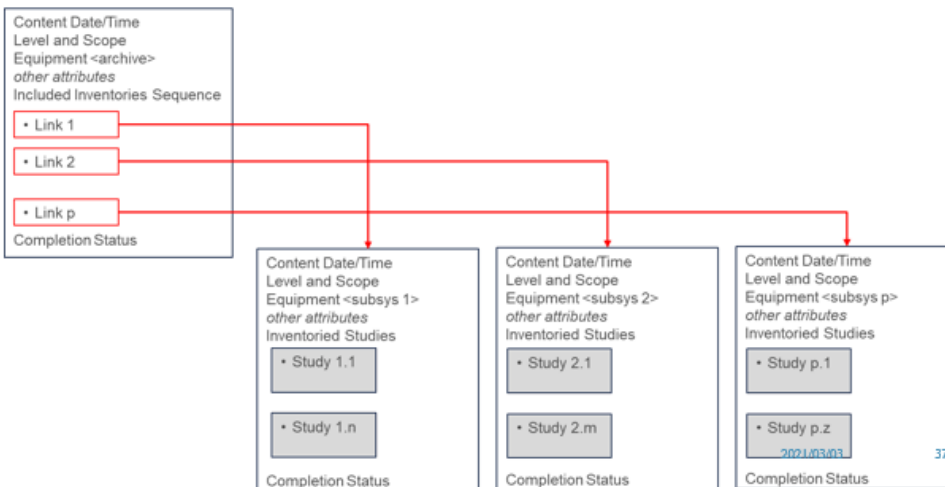
**Baseline included by reference in incremental update inventory, changed study simply has new record**

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Baseline and incremental update – now you do an incremental inventory, links back to the baseline, includes records for studies that are new or have changed.  
Since we removed the restriction about study appearing only once in the inventory, we can have multiple records for the same study at different dates and the consuming application will see two dates and know it has to reconcile them.  
Scope of this incremental object is the entire inventory.

## Example Approach: Parallel inventory (multiple subsystems)



Master and 3 or more subsystems. Each subsystem is tasked with producing inventory for its content, each one will have content date/time, scope and say which equipment it is and say – I’m complete with respect to my scope, each subsystem will do the same and main inventory will just link to those, and say ok this is complete in respect to my scope, which is the entire archive.

You may have a situation where the series of a study are distributed across multiple subsystems, you have your primary acquisition, then post processing created a new series of analytic results for that study and that gets put in another subsystem, each subsystem knows only about its records. It will be up to the consuming app to reconcile these records.

## Multiple records for study

- Study may appear multiple times in tree of inventory SOP instances
  - Parallel production of inventories with replicated storage, or with different series on different subsystems
  - Sequential production (baseline + increment) with change to study content
- Consumer required to reconcile
  - No consolidation/reconciliation requirement on producer – simplify production
  - Consumer (migration client) typically needs to do reconciliation anyway due to bad data or idiosyncratic/poor PACS implementation
- Inventory records identify equipment and time stamp to support reconciliation

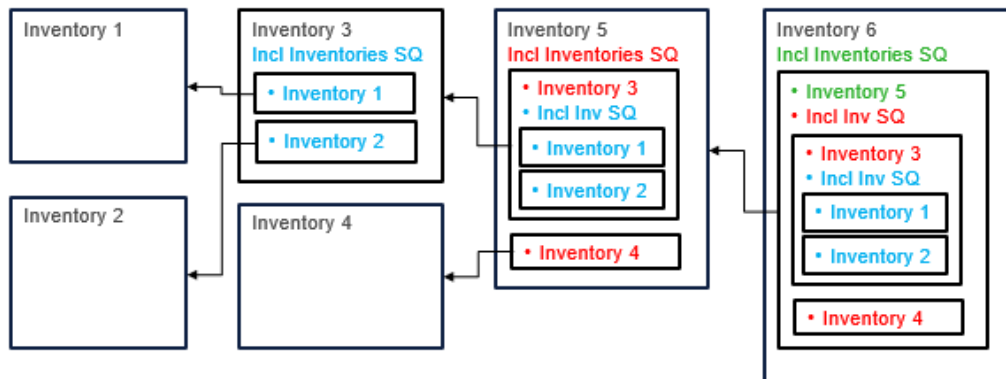
Challenge for the inventory user to retrieve all the referenced inventories in the tree. There is a capability to have a query retrieve on inventory objects but no requirement that that service be implemented.

Inventory object includes the access info with each link to a referenced inventory – any and all of DIMSE inventory query retrieve or DIOCMWEB non patient instance service or non-DICOM file access protocol. – in current draft 20.

And the included inventory instance sequence is defined recursively, so it creates a tree structure.

On the production side – when you are including a subsidiary inventory instance, you just copy its referenced included inventories into your link.

## Links with hierarchical structure of subtree links



**Links structure from referenced object added in toto as subsidiary attribute**

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## Inventory links in related services

- Related Services need to reference an inventory
  - Inventory Creation complete N-EVENT REPORT
  - Inventory Query Model C-FIND
- With tree of Inventory Instances, do we give entire tree, or just the root?
- Mechanics of specifying recursive structure in DIMSE-N services is problematic
- Current approach is to identify only root inventory object in N-EVENT REPORT and C-FIND
  - With full tree and access links in Included Inventory Instances SQ, app only needs to open one object (root)
  - Is this acceptable?

In order to get to the content inventory, you basically only need the root object. If you do implement either the inventory creation service and when you get a completion it reports back the inventory object it made, or you do a query and find an inventory object -what you get? Inventory object or the whole tree back? A recursive structure in a DIMSE service is problematic, so non problematic approach is - you retrieve the root and individually traverse the tree? Yes.

Draft 20 review

## **Table C.YY.1-1 Inventory Module Attributes**

### **Inventoried studies sequence**

Inventory link macro – we are linking to a SOP class instance UID, it has a retrieve AE Title, retrieve URL for DICOMWEB, stored file access, macro for a URI based access non-DICOM protocol, included inventory sequence.

Recursive structure you can do in a composite SOP instance like SR, same mechanism used in SR to create the tree of SR observations.

Other change – broke out stored files access macro which has the URI, set of attributes for linking to stored instances that appear a couple of different times, so it's now broken out separately.

The other major change is now in the informative annex, part 17. New section on the inventory instance tree. Line by line review.

#### Questions before review:

Can you get cycles in your inventory raft? Don't think it's logically consistent with the definition of including trees.

Can you reference the non-complete instances without referencing the complete instance in a scope? Yes

Is there any logic of including a study only but not including any files links to indicate that the only thing that's changed is metadata – No – each study is supposed to be fully defined.

Make sure these questions are addressed in the standard for clarity.

If doing incremental change, they need to delete studies that have been deleted since time of last inventory.

How to quickly locate the root instance – if you are using the inventory creation SOP class, it will be returned to you; if you are doing a query and you have a whole bunch of inventory objects that return the query, you find the one that matches your intended date, time, content and start there. And if you don't have either of those, you can get it by email.

If I am doing a multi part incremental – do each of the incremental instances contain the full reference to the baseline or just the complete incremental instance?

When you start this process, you don't know whether you will need more than 1 object, start of by 1<sup>st</sup> object referencing your baseline. Then next object, since its linking to that, has to include links that were included in the previous one.

Schedule for WG-6 to review our Supplement#223:

3/22 at 1:45 pm ET for 2 hours

3/24 @ 11:15 am ET for 2 hours

3/26 at 11:15 am ET for 2 hours

We have one more meeting on 3/17 to go over any final changes before putting it in front of WG-6

## **5 OLD BUSINESS**

## **6 NEW BUSINESS**

## **7 DATE AND TIME OF NEXT MEETINGS (Secretariat)**

- Continue T-con meetings bi-weekly
- Next call is March 17, 2021 between 11:00 am and 12:30 pm ET

<b><u>NEMALINK CODE</u></b>	09-WG33
<b><u>SUBMITTED BY</u></b>	Hull, Carolyn
<b><u>SUBMITTED ON</u></b>	3/31/21
<b><u>LEGAL APPROVAL</u></b>	4/7/21
<b><u>UPLOAD LOCATION</u></b>	Enter upload location.