SR Object Model (SR-OM)  
- Towards an API for toolkits

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The need for an API

- SR is primarily encoded in DICOM
- DICOM parsing/encoding requires tools
- May need transcoding into XML, HL7 …
- Input methods, rendering rules essentially independent of encoding
- Standard API to separate encoding from applications
Transcoding Applications

```
... (0x0040,0xa491) <COMPLETE>
(0x0040,0xa493) <VERIFIED>
(0x0040,0xa730) Content Sequence
(0x0040,0xa010) <HAS OBS CONTEXT>
(0x0040,0xa040) <PNAME>
(0x0040,0xa043) Concept Name Code Sequence
(0x0008,0x0100) <000555>
(0x0008,0x0102) <Recording Observer>
(0x0008,0x0104) <Smith^John^^Dr^>
...DICOM
Internal
XML
```
Report of Chest X-Ray (PA and Lateral Views)

Patient Jane Homer
Study # 123456
Recorded by Dr. John Smith

The finding is a mass measuring 1.3 cm in diameter with an infiltrative margination.

Chest X-Ray

has concept modifier Views=PA and Lateral
Recording Observer=Smith\^John^^Dr^Study Instance UID 
...=1.2.3.4.5.6.7.100
Patient-Data-Acquisition-Subject=Homer\^Jane^^Finding=Mass

has properties diameter=1.3 cm
has properties margination=infiltrative (1.4.2)
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Tree rewriting

Specific Application
Tree rewriting

Generic Application

Rules in pattern language
Precedent in XML World - DOM

- Document Object Model (W3C rec.)
  - Parse an XML document
  - Validate against DTD
  - Represent as tree
  - Multi-language bindings for accessor methods
  - Edit/generate tree elements
  - Write out as an XML document
SR - why not just use DOM?

- Structure of the SR tree slightly different
- Node content different
- Constraints on value types different
  - XML - just PCDATA
  - SR - PNAME, NUM, IMAGE, SCOORD etc.
SR Object Model (SR-OM) API

- Follow DOM as closely as possible
- Generic specification in IDL
- Multiple language bindings
  - C++
  - Java
  - ECMAScript, Python, ...
- Accessor methods rather than generic collections (STL, Java 2 Collections)
interface SRDocument {
    SRNode getRootNode();
};

interface SRNode {
    String getConceptName();
    SRValueType getValueType();
    SRValue getValue();
    ...
    SRNode getParent();
    SRNode getFirstChild();
    SRNode getNextChild();
    ...
};
SR-OM Decisions

Is DOM concept sufficient?
- other XML API approaches
- SAX - event driven tree traversal

Accessors
- Iterators: getNextChild()
- Indexed: getNamedChild(ConceptName)

Validation a separate interface?
SR-OM Home

DICOM Working Group home?
- WG 8 SR, WG 6 Base Standard, new WG?
- Joint effort with HL-7 (WG 20)
- Vendor consensus (ad hoc group)?

Document home?
- DICOM Standard?
- DICOM Recommendation?
- Ad hoc consensus document