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MANAGEMENT DEVELOPERS CONFERENCE

City Center Marriott
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Machine Readable Profiles (MRP)

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Disclaimer

- The information in this presentation represents a snapshot of work in progress within the DMTF.
- This information is subject to change. The Standard Specifications remain the normative reference for all information.
- For additional information, see the Distributed Management Task Force (DMTF) Web site.

DMTF

distributed management task force, inc.

The DMTF was formed to lead the development, adoption and unification of management standards and initiatives for desktop, enterprise and internet environments

What are Machine Readable Profiles?

- Machine Readable Profiles (MRP) is an XML format for management profiles

- A profile in MRP format describes everything a "paper profile" describes:
  - the "logical profile" (classes, etc.)
  - document related information (bibliography, conventions, etc.)

- The MRP format fully supports the new concepts of DSP1001 1.1
  - DSP1001 = Profile Usage Guide, aka "PUG"

- The MRP format can be used for any profiles compliant to DSP1001 1.1
  - regardless of owning organisation (e.g. DMTF, SNIA, vendors)

Motivation for MRP

- Easier for profile authors
  - Context driven selection of admissible elements
  - Validation of profile elements
    - Against CIM schema, DSP1001 1.1 rules, between profile elements
  - Much less text to write than for paper profiles
    - A lot of the text written in paper profiles is now generated

  Ok, there is a learning curve to write the MRP XML

- Easier for profile implementers
  - Effects of multiple profiles can be merged by tooling
    - "profile merge" algorithm defined in DSP1001 1.1
- Generation of implementation artefacts from the MRP profile
  - Stubs for server side instrumentation (e.g. providers)
  - Simple test code (based on profile definition)
  - Client side proxy layers
  - Implementation MOF
  - Various kinds of documentation
- We can develop machine readable test cases based on MRP profiles, providing for:
  - Generic test case driver using machine readable test cases as input
  - Verify consistency of machine readable test cases with MRP profiles
  - Analyze test coverage of machine readable test cases

Status of MRP work

- MRP 1.0.0 released as DMTF Standard in 3/2012
- MRP 1.0.1 update released in 8/2012
- MRP 1.1.0 coming up
  - Pattern profiles
  - Property and method implementation conditions
  - Many improvements in HTML / PDF generation & tooling
  - See readme file in DSP2023 for a complete list if changes

MRP related standards

- **DSP1001.pdf (v1.1) – Management Profile Usage Guide**
  - Defines the profile concepts as a basis for both "paper profiles" and MRP
  - Defines document related rules for "paper profiles"
- **DSP2023.zip – Management Profile XML Samples**
  - 4 real DMTF profiles in MRP format as examples
  - Demonstrates usage of MRP for a glossary
  - MRP template (starting point for new MRP profiles)
  - Tools for an MRP development environment (Python scripts, makefile)
  - Copies of .xsd and .xsl files needed for developing MRP
- **DSP8028.xsd – Management Profile XML Schema**
  - Annotated XML schema for MRP
- **DSP8050/8051/8052/8053.xsd – Common document related XML schemas**
  - Included by DSP8028
- **DSP8029.xsl – Management Profile Print XSLT Stylesheet**
  - Converts an MRP XML document to HTML -> for review
- **DSP8054.css – Common document related CSS stylesheet**
  - Controls the layout of the HTML file produced by DSP8029
  - Uses the layout of current DMTF "paper profiles"
  - Can be customized by other orgs or vendors to their layouts

How to get started with MRP

- Start with downloading the examples & tools (DSP2023)

  http://www.dmtf.org/standards/published_documents/DSP2023_1.0.zip

- The zip file contains a readme file that explains how to set up
  - Eclipse-based environment
  - make-based environment

- Start by playing around with the sample profiles:
  - XMP1000: MRP XML profile template
  - XMP1009: MRP version of DSP1009 (Sensors Profile)
  - XMP1011: MRP version of DSP1011 (Physical Asset Profile)
  - XMP1013: MRP version of DSP1013 (Fan Profile)
  - XMP1033: MRP version of DSP1033 (Profile Registration Profile)
  - XMP1999: Sample glossary in MRP format

Syntax help with MRP XML

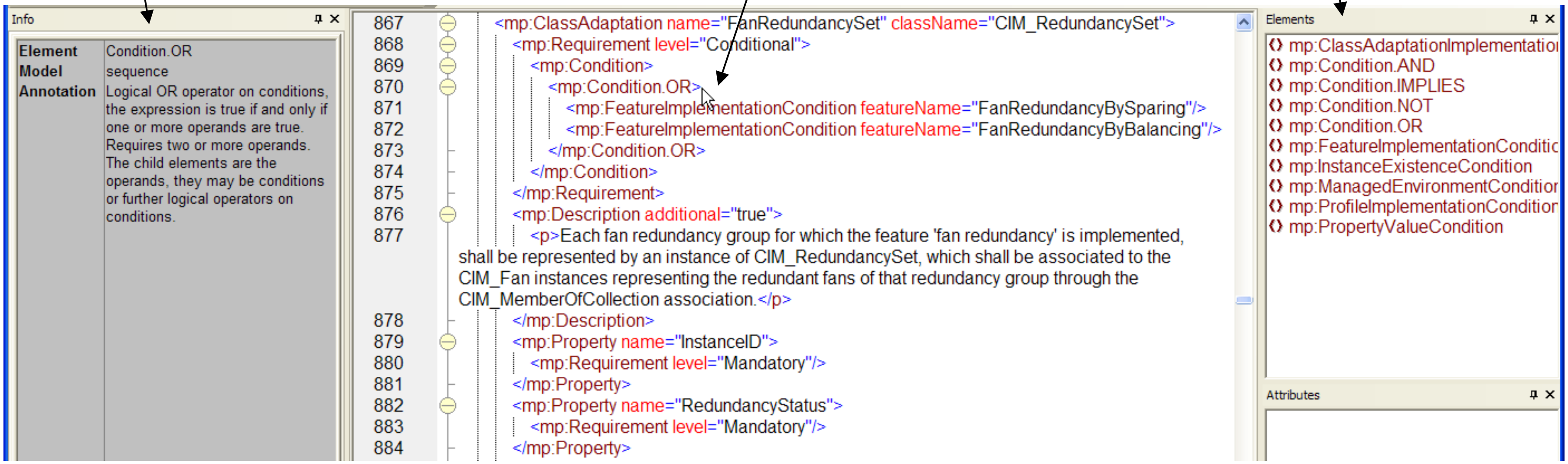
- **The MRP related XML schemas (DSP8028, DSP805x) are documented using <xsd:annotation> elements**
  -> Most XML editors show these annotations as help text

- **Most XML editors show the allowable XML elements and attributes for the current context**

Help text for that context (from XSD annotations)

Cursor, defining the context

Allowable elements and attributes for that context



Info

Element	Condition.OR
Model	sequence
Annotation	Logical OR operator on conditions, the expression is true if and only if one or more operands are true. Requires two or more operands. The child elements are the operands, they may be conditions or further logical operators on conditions.

```
<mp:ClassAdaptation name="FanRedundancySet" className="CIM_RedundancySet">
  <mp:Requirement level="Conditional">
    <mp:Condition>
      <mp:Condition.OR>
        <mp:FeatureImplementationCondition featureName="FanRedundancyBySparing"/>
        <mp:FeatureImplementationCondition featureName="FanRedundancyByBalancing"/>
      </mp:Condition.OR>
    </mp:Condition>
  </mp:Requirement>
  <mp:Description additional="true">
    <p>Each fan redundancy group for which the feature 'fan redundancy' is implemented,
shall be represented by an instance of CIM_RedundancySet, which shall be associated to the
CIM_Fan instances representing the redundant fans of that redundancy group through the
CIM_MemberOfCollection association.</p>
  </mp:Description>
  <mp:Property name="InstanceID">
    <mp:Requirement level="Mandatory"/>
  </mp:Property>
  <mp:Property name="RedundancyStatus">
    <mp:Requirement level="Mandatory"/>
  </mp:Property>
```

Elements

- mp:ClassAdaptationImplementatio
- mp:Condition.AND
- mp:Condition.IMPLIES
- mp:Condition.NOT
- mp:Condition.OR
- mp:FeatureImplementationConditic
- mp:InstanceExistenceCondition
- mp:ManagedEnvironmentConditior
- mp:ProfileImplementationConditior
- mp:PropertyValueCondition

Attributes

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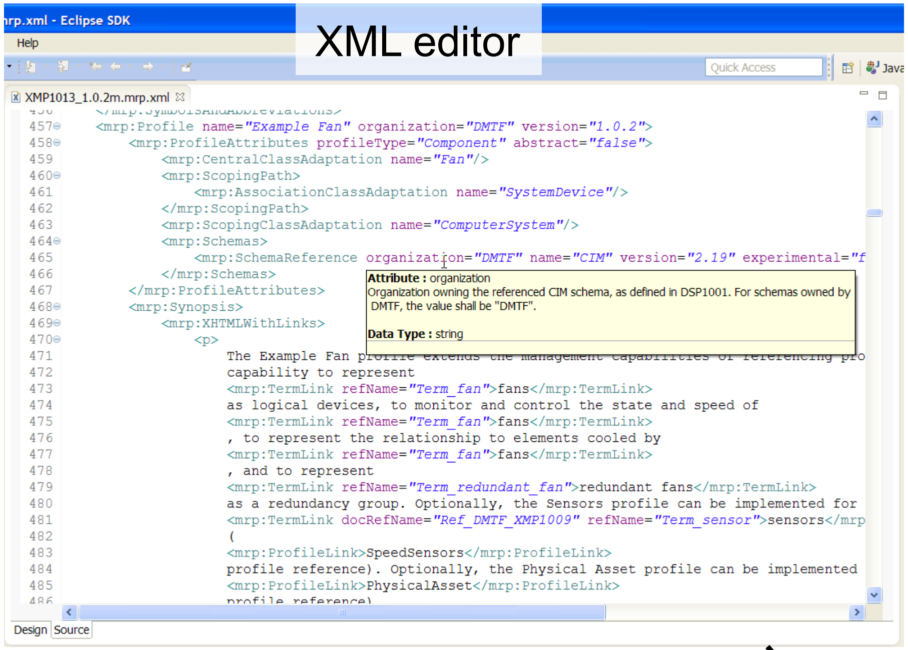
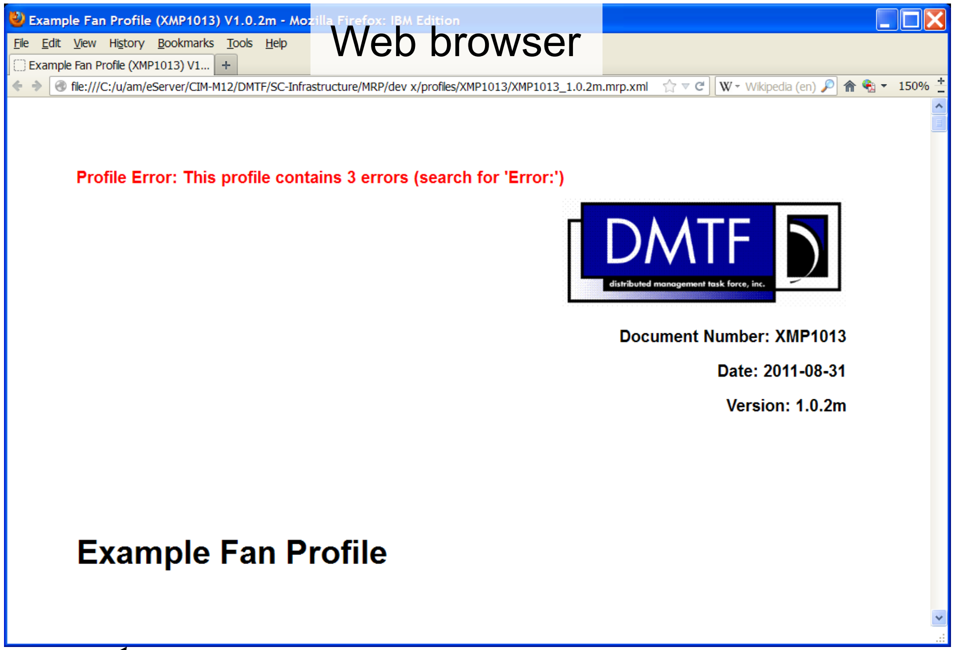
Practical Working with MRP



```
        </mrp:SymbolsAndAbbreviations>
        <mrp:Profile name="Example Fan" organization="DMTF" version="1.0.2">
            <mrp:ProfileAttributes profileType="Component" abstract="false">
                <mrp:CentralClassAdaptation name="Fan"/>
                <mrp:ScopingPath>
                    <mrp:AssociationClassAdaptation name="SystemDevice"/>
                </mrp:ScopingPath>
                <mrp:ScopingClassAdaptation name="ComputerSystem"/>
                <mrp:Schemas>
                    <mrp:SchemaReference organization="DMTF" name="CIM" version="2.19" experimental="f
                </mrp:Schemas>
            </mrp:ProfileAttributes>
            <mrp:Synopsis>
                <mrp:XHTMLWithLinks>
                    <p>
                        The Example Fan profile extends the management capabilities of referencing pro
                        capability to represent
                        <mrp:TermLink refName="Term_fan">fans</mrp:TermLink>
                        as logical devices, to monitor and control the state and speed of
                        <mrp:TermLink refName="Term_fan">fans</mrp:TermLink>
                        , to represent the relationship to elements cooled by
                        <mrp:TermLink refName="Term_fan">fans</mrp:TermLink>
                        , and to represent
                        <mrp:TermLink refName="Term_redundant_fan">redundant fans</mrp:TermLink>
                        as a redundancy group. Optionally, the Sensors profile can be implemented for
                        <mrp:TermLink docRefName="Ref_DMTF_XMP1009" refName="Term_sensor">sensors</mrp
                        (
                        <mrp:ProfileLink>SpeedSensors</mrp:ProfileLink>
                        profile reference). Optionally, the Physical Asset profile can be implemented
                        <mrp:ProfileLink>PhysicalAsset</mrp:ProfileLink>
                        profile reference)
```

Attribute : organization
Organization owning the referenced CIM schema, as defined in DSP1001. For schemas owned by DMTF, the value shall be "DMTF".

Data Type : string


Example Fan Profile (XMP1013) V1.0.2m - Mozilla Firefox: IBM Edition
File
Edit
View
History
Bookmarks
Tools
Help
Web browser
Example Fan Profile (XMP1013) V1...
file:///C:/u/am/eServer/CIM-M12/DMTF/SC-Infrastructure/MRP/dev x/profiles/XMP1013/XMP1013_1.0.2m.mrp.xml
Wikipedia (en)
150%
DMTF
distributed management task force, inc.

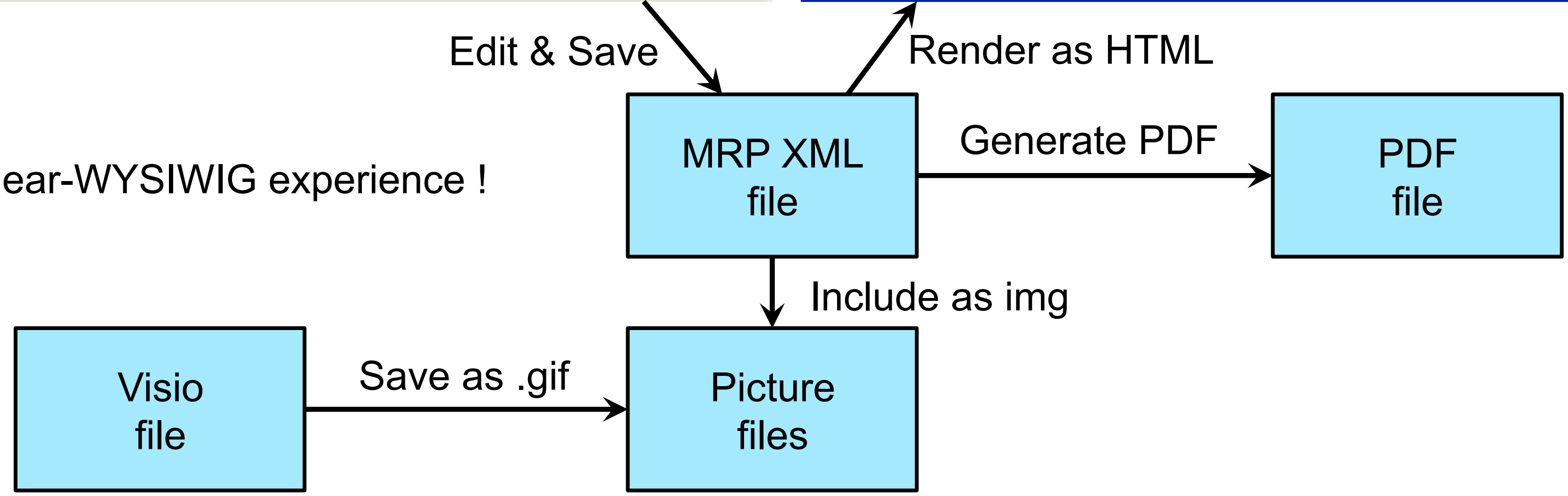
Profile Error: This profile contains 3 errors (search for 'Error:')

Document Number: XMP1013

Date: 2011-08-31

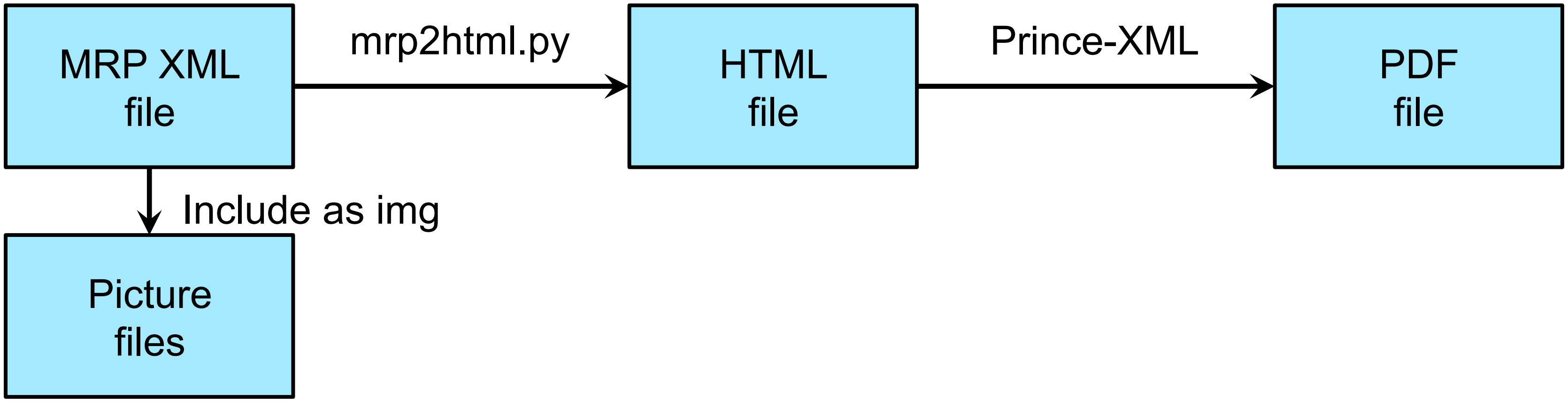
Version: 1.0.2m

Example Fan Profile



Near-WYSIWIG experience !

Generating PDF files



MRP XML file

mrp2html.py

HTML file

Prince-XML

PDF file

Include as img

Picture files

dsp8029.xsl
dsp8054.css
dsp8008.xml
tocgen.js (from DSP2023.zip)

- Integrated into Eclipse via mrpbuild.ant script that comes with DSP2023.zip
- Integrated into make-based build process that comes with DSP2023.zip
- Prince-XML: www.princexml.com

Transitioning to MRP

- "Paper profiles" can be turned into MRP profiles:
  - in a new minor release (1.0.0 paper profile -> 1.1.0 MRP)
  - in a new major release (1.2.0 paper profile -> 2.0.0 MRP)
  - transition to MRP alone is not a reason to increase the major version
- Profiles referenced in an MRP profile can be "paper profiles" or MRP profiles
- Publishing MRP profiles:
  - PDF produced from .mrp.xml source file is published like PDF of "paper profile"
  - The .mrp.xml source file is published on schemas.dmtf.org, in addition

Information in a profile

- Profiles contain these two types of information:
  - Applies to both machine readable profiles and to "paper profiles"

"logical profile" related:

- Basic profile attributes
- Scoping algorithm
- CIM schemas
- Synopsis
- Description
- Referenced profiles
- Referenced message & metric registries
- **Features**
- **Class related requirements**
- Use cases

document related:

- Title page
- Copyright
- Foreword
- Document conventions
- Acknowledgements
- Normative references
- Scope
- Terms and definitions
- Symbols and abbreviations
- Bibliography
- Change history

Features

- DSP1001 1.1 formalized a concept that has always been in management profiles: **Features**
- A feature describes optional functionality that affects a number of profile elements
- Features define:
  - Their name
  - The additional functionality provided by implementing the feature in understandable terms
  - At what granularity the decision to implement the feature can be made (e.g. single instance vs. once for the whole profile)
  - How a client can discover whether the feature is implemented
- Elements affected by a feature get connected to the feature by:
  - Defining them as conditional on the feature, or by
  - Defining constraints based on implementation of the feature
- Advantages:
  - Leads to a structure that is easier to understand
  - Enables machine processing of features

Class related requirements

- DSP1001 1.1 formalized a concept that has always been in management profiles: Requirements on classes = **Class Adaptations**
- In PUG 1.0 profiles, these requirements were organized by class name. If a class was used more than once in a profile, some text in parenthesis was added.
  Example: CIM_ComputerSystem (virtual system)
- Class adaptations define:
  - Their name (unique in the defining profile)
  - The Schema class they specify requirements on
  - The actual requirements on the class (and its properties, methods)
  - Zero or more *base adaptations* whose requirements also apply
- Advantages:
  - Adaptation name is a formal name and can be referenced from outside
  - Base adaptations formalize the way profiles connect their elements and enable machine processing of the profile

MRP XML: High level structure

```
<mrp:ProfileSpecification version=1.0 . . .

    <mrp:DocumentControlInformation . . .
    <mrp:NormativeReferences . . .
    <mrp:Bibliography . . .
    <mrp:TermsAndDefinitions . . .
    <mrp:SymbolsAndAbbreviations . . .

    <mrp:Profile name="Example Fan" ...
        <mrp:ProfileAttributes profileType="Component" . . .
        <mrp:Synopsis . . .
        <mrp:Description . . .
        <mrp:RelatedProfiles . . .
        <mrp:MessageRegistries . . .
        <mrp:MetricRegistries . . .
        <mrp:Features . . .
        <mrp:Elements . . .
        <mrp:Actors . . .
        <mrp:UseCases . . .
    </mrp:Profile>

</mp:ManagementProfile>
```

Profile document related information

Logical profile related information

MRP XML: Rich text using XHTML

Any descriptive text in MRP uses XHTML 1.1

- XHTML is basically HTML that conforms to XML rules.
- XHTML 1.1 is a W3C Recommendation

Example:

```
<mrp:TermDefinition name="Term_autonomous_profile">
  <mrp:Term>autonomous profile</mrp:Term>
  <mrp:Definition>
    <mrp:XHTMLWithLinks>
      <p>a profile that addresses an autonomous and self-contained management
        domain. For a complete definition, see <mrp:NormativeReferenceLink
        refName="Ref_DMTF_DSP1001">DSP1001</mrp:NormativeReferenceLink>.</p>
      <p><mrp:NormativeReferenceLink
        refName="Ref_DMTF_DSP1001">DSP1001</mrp:NormativeReferenceLink>
        defines that in autonomous profiles, the <mrp:TermLink
        refName="Term_central_class_adaptation">central class
        adaptation</mrp:TermLink> and <mrp:TermLink
        refName="Term_scoping_class_adaptation">scoping class
        adaptation</mrp:TermLink> are the same.</p>
      . . .
    </mrp:XHTMLWithLinks>
  </mrp:Definition>
</mrp:TermDefinition>
```

MRP XML: Text registries

Boiler plate text can be defined by referencing text fragments defined in a text registry. DSP8008.xml is a text registry that defines MRP specific boiler plate text

Example:

```
<mrp:TextRegistryReference name="TextReg_DMTF_DSP8008">
  <mrp:OwningEntity>DMTF</mrp:OwningEntity>
  <mrp:ID>DSP8008</mrp:ID>
  <mrp:Title>MRP Organization Message Registry for DMTF</mrp:Title>
  <mrp:Version>1.1</mrp:Version>
  <mrp:Location>http://schemas.dmtf.org/wbem/mgmtprofile/1/dsp8008_1.1.xml
   </mrp:Location>
</mrp:TextRegistryReference>

<mrp:Copyright>
  <mrp:XHTMLWithLinks>
    <mrp:XHTMLRegistryText regRefName="TextReg_DMTF_DSP8008"
                           textFragmentName="Copyright Notice">
      <mrp:DynamicElementValue name="Years">2006-2013</mrp:DynamicElementValue>
    </mrp:XHTMLRegistryText>
  </mrp:XHTMLWithLinks>
</mrp:Copyright>
```

MRP XML: Links in rich text

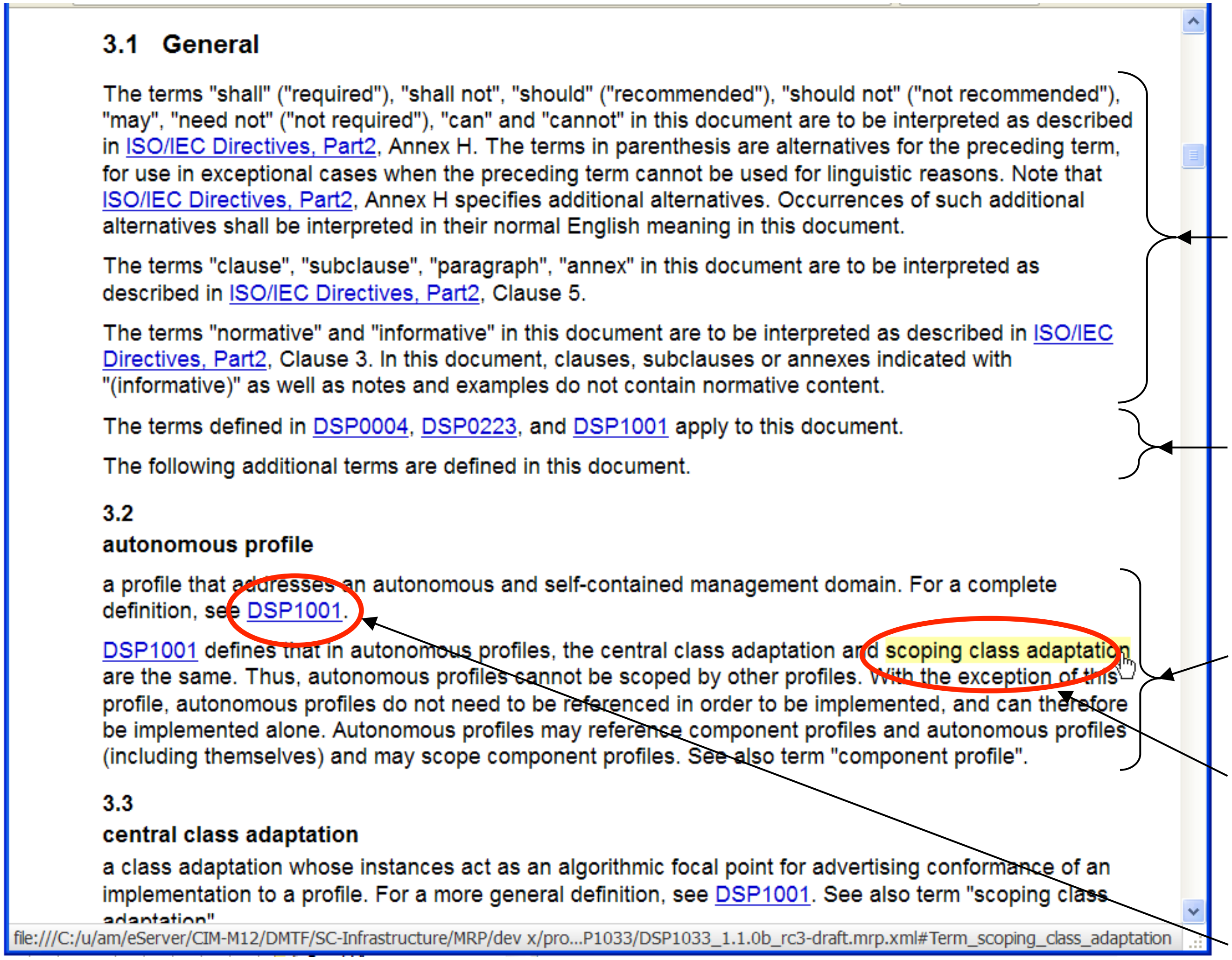
- **Links can target the following MRP profile elements:**
  - Terms, symbols
  - Normative references, bibliography entries
  - Related profile references
  - Metric & message registry references
  - Features
  - Class adaptations, properties, methods, parameters & return values, operations
  - Use cases
  - Headings, Figures, Tables
- **Targeted elements can be in the same profile or in a related profile (MRP or paper)**

- **Examples:**
  - Link to class adaptation in same profile:

    ```
    <mrp:ClassAdaptationLink>MyAdaptation</mrp:ClassAdaptationLink>
    ```
  - Link to class adaptation in a related profile:

    ```
    <mrp:RelatedProfile refName="OtherProfile" . . .
    <mrp:ClassAdaptationLink
    profileRefName="OtherProfile">OtherAdaptation</mrp:ClassAdaptationLink>
    ```

HTML output



3.1 General

The terms "shall" ("required"), "shall not", "should" ("recommended"), "should not" ("not recommended"), "may", "need not" ("not required"), "can" and "cannot" in this document are to be interpreted as described in ISO/IEC Directives, Part2, Annex H. The terms in parenthesis are alternatives for the preceding term, for use in exceptional cases when the preceding term cannot be used for linguistic reasons. Note that ISO/IEC Directives, Part2, Annex H specifies additional alternatives. Occurrences of such additional alternatives shall be interpreted in their normal English meaning in this document.

The terms "clause", "subclause", "paragraph", "annex" in this document are to be interpreted as described in ISO/IEC Directives, Part2, Clause 5.

The terms "normative" and "informative" in this document are to be interpreted as described in ISO/IEC Directives, Part2, Clause 3. In this document, clauses, subclauses or annexes indicated with "(informative)" as well as notes and examples do not contain normative content.

The terms defined in DSP0004, DSP0223, and DSP1001 apply to this document.

The following additional terms are defined in this document.

3.2
autonomous profile

a profile that addresses an autonomous and self-contained management domain. For a complete definition, see DSP1001.

DSP1001 defines that in autonomous profiles, the central class adaptation and scoping class adaptation are the same. Thus, autonomous profiles cannot be scoped by other profiles. With the exception of this profile, autonomous profiles do not need to be referenced in order to be implemented, and can therefore be implemented alone. Autonomous profiles may reference component profiles and autonomous profiles (including themselves) and may scope component profiles. See also term "component profile".

3.3
central class adaptation

a class adaptation whose instances act as an algorithmic focal point for advertising conformance of an implementation to a profile. For a more general definition, see DSP1001. See also term "scoping class adaptation"

file:///C:/u/am/eServer/CIM-M12/DMTF/SC-Infrastructure/MRP/dev x/pro...P1033/DSP1033_1.1.0b_rc3-draft.mrp.xml#Term_scoping_class_adaptation

- Fragments from DSP8008 text registry
- Text generated by DSP8029 XSLT
- Text written in XHTML
- Link in HTTP style (blue underlined), for document references
- Link in yellow background style (when moved over), for all other elements

Summary & Take-aways

- **Machine Readable Profiles are real !**
  - MRP standards 1.0 available
  - MRP standards 1.1 coming up
- **First few DMTF profiles are being converted to MRP**
  - DSP1117 1.0.0 (Management Initiative Registration Profile)
  - DSP1055 1.0.0 (Base Systems Profile)
  - DSP1033 1.1.0 (Profile Registration Profile)
- **MRP can be introduced very incrementally**
  - e.g. in a new minor release of an existing "paper profile"
  - "Paper profiles" and MRP profiles can be referenced from each other
- **MRP profiles can be published in PDF format like "paper profiles"**