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Summary of Changes in Version 2 of TIM (Telecommunications Interchange Markup)

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1 Introduction

1.1 Purpose and Scope

This document is a brief summary of the changes proposed for version 2 of Telecommunications Interchange Markup (TIM). Complete documentation of TIM 2 is available in TCIF-IPI-95-004-PART1, Issue 1A (Draft), *Introduction to Telecommunications Interchange Markup (TIM)*, and TCIF-IPI-95-004-PART2, Issue 1A (Draft), *The Telecommunications Interchange Markup (TIM) Reference*. These documents and the TIM 2 DTD itself may be downloaded from the following sites:

<http://www.atis.org/atis/tcif/ipi>
<ftp://ftp.bellcore.com/pub/world/TCIF> (not accessible with Web browsers)
<ftp://ftp.isogen.com/pub/tcif>

1.2 What is TIM?

TIM is the Standard Generalized Markup Language (SGML) Document Type Definition (DTD) recommended as the markup for reusable-form electronic technical documentation in the telecommunications industry. SGML is an ASCII format that uses tags like "<Title>" and "</Title>" to mark the beginning and end of structural units (referred to as "elements"). It also uses attributes to indicate specific meanings or formatting choices for elements, for instance "<OrderedList type='StepList' numeration='upperalpha' prefix='Step '>".

As SGML, TIM is a reusable form, meaning that it can be reimported into the same authoring application used to create the document or to many others. It is also a format that can be edited directly, with any ASCII-text editor. In cases where reusability and revisability are desirable, this is an advantage shared by HTML (HyperText Markup Language), one of the other two common formats for electronic documents. PDF (Portable Document Format) is not revisable or reusable.

TIM is specifically designed for technical documentation in the telecommunications industry, so besides the paragraph, heading, and list markup it shares with HTML, it also has markup for admonishments (Danger, Warning, and Caution messages), annotations, complex tables, appendixes, tables of contents and indexes. It also provides attributes that allow the author to give special meaning to any element. For instance, while HTML has elements for emphasis and strong emphasis, TIM provides an attribute for the **Emph** element to specify bold, italic, bold italic, roman, underline, double-underline, color, or a system-specific style. So far it has not been difficult to represent the structure of any company's technical documents using TIM's available elements and attributes, something that is impossible in HTML.

1.3 Why change TIM?

TIM 1 was approved as a TCIF Guideline in December of 1995. Since then a few companies have begun to produce TIM documents, but many more are about to do so. The IPI Committee realized that it would help those companies if any desirable revisions were made before rather than after much effort had been put into their implementations. There were four reasons to revise it:

1. Experience accumulated by the early adopters showed several small ways the DTD could be improved.
2. Two minor features of the DTD were seen as limiting its use outside the telecommunications industry: the element name **Te1Doc** and the lack of any element for admonishments (warning messages) other than the traditional ones used in the industry (**Danger**, **Caution**, and **Warning**). The value of having the DTD used beyond the telecom industry is that it makes SGML tool vendors more willing to develop applications that work well with TIM, and it appears that they have already begun to do so since these changes to TIM have been proposed.
3. Within the World Wide Web standards groups, a simplified version of SGML known as XML (eXtensible Markup Language) has been emerging. It is easier to use than SGML and will probably be supported much more widely on the Internet. Some simplifications were needed in TIM to make it comply to the anticipated XML standard.
4. Document providers were looking for ways to use more detailed or more restrictive SGML DTDs than TIM for their internal use, but wanted to be able to create TIM documents easily for interchange. Certain changes would make TIM a better "core architecture" from which special-purpose DTDs could be derived systematically.

Therefore the IPI Committee began defining and testing proposed changes to TIM in December 1996. As of now all proposed changes have been incorporated into TIM 2. They have been tested by six document providers and four recipients. The IPI Committee has agreed without dissent to offer TIM 2 as a replacement for TIM 1, subject to approval through letter ballot by the full TCIF. It has also agreed to make no further major modifications to TIM for at least two years, believing that stability will encourage the widest adoption as a voluntary industry standard.

2 What's New in TIM 2

2.1 Changes to Make TIM XML-Compliant

1. Changed the SGML declaration, which sets certain restrictions on the size and complexity of DTDs and documents.
 - a. Specified Formal NO, meaning that Public Identifiers do not have to be defined in a formal syntax. This removes an earlier restriction, so it does not affect existing TIM documents.
 - b. All "capacities" made 99999999 (effectively unlimited). This removes earlier restrictions. All "quantities" should also be 99999999 for strict XML compliance, but many current tools don't allow that. Capacity and quantity statements in an SGML declaration set limits on the size and complexity of the SGML documents that follow it, but with today's computing power there is no need for such limits, and XML does not want to be bothered with them. Leaving lower limits on quantities in place, as we have, does not make any instances noncompliant with XML, even though the declaration is not strictly compliant.

Two necessary changes to the SGML declaration were deferred until current SGML tools will allow them: they are changes to the tag closing delimiters for empty elements (from ">" to "/>") and processing instructions (from ">" to "?>"). Giving these two kinds of markup unique closing delimiters makes automated processing much simpler, a goal of XML.

2. Removed inclusions in content models. Inclusions are elements permitted to occur anywhere within an element or any of its subelements. The endless possibilities this presents make automated processing difficult, so XML does not allow them. TIM 1 used several inclusions in content models, and they were removed in various ways:
 - a. The **Alert**, **Float**, and **AltRep** elements, used as wrappers to indicate special presentation of the enclosed elements, became attribute values (of the *present* attribute) for most elements. THIS INVALIDATES SOME TIM 1 DOCUMENTS.
 - b. **Span**, used to mark the beginning of a virtual element that crosses other element boundaries, was replaced by the *spanend* attribute for **Pt** (the existing *close* attribute does much the same job when defined for a **Pt** element at the other end of the span, but it was retained for stream processing). THIS MAY INVALIDATE A FEW TIM 1 DOCUMENTS.
 - c. **GlossEntry** was removed (it was judged unnecessary; the job can be done by a **VariableList**).
 - d. **IndexEntry** was split into **IndexEntry** for indexes and TOCs and **IndexTerm** for hidden elements used to generate index entries. Both appear where appropriate in content models. The existing **IndexTerm**, used only to

- mark the target of a reference from an index entry, was removed (it is easily replaced by **T**). THIS MAY INVALIDATE SOME TIM 1 DOCS.
- e. **Pt** became a regular (as opposed to inclusion) element, allowed in almost all content models.
 - f. **Graphic**, **Object**, and **ExternalText** became regular elements, allowed in most content models.
 - g. **DBLink**, **BiLink**, and **BiDBLink** were removed as unnecessary.
 - h. **Link**, **NameLoc**, **TreeLoc**, and **DataLoc** were moved to an optional **Resources** element after **DocID**. THIS INVALIDATES SOME TIM 1 DOCS.
3. Removed exclusions from content models. Exclusions are elements prohibited within an element or any of its subelements. Most exclusions in TIM 1 were to prevent **AltRep** from bringing in elements not allowed at the current place, and that is not a problem without **AltRep**. This change doesn't invalidate anything, but it removes the previous restriction on nesting **EntryTbl**, a table inside a table cell.
 4. Made all external cross-references by URL (Uniform Resource Locator, as in World Wide Web documents). This change does not affect HyTime cross-references, which SGML sees as internal. It is done by eliminating the **DBRef** and **DBLink** elements and the *dbid* attribute on **IndexEntry**. THIS MAY INVALIDATE SOME TIM 1 DOCUMENTS.
 5. Changed the attribute data types NAME, NUMBER, and NUTOKEN to NMTOKEN. This has no undesirable effect; all valid NAMES, NUMBERS, and NUTOKENs are valid NMTOKENs.
 6. Now allow PCDATA (parsed character data, the SGML term for text) only in content models consisting of "repeating OR groups", for example "(#PCDATA|Element1|...|Elementn)". This required no changes to TIM 1 but constrained choices for new and revised elements.

2.2 Changes to Make it Acceptable to Non-Telecom Users

1. Changed **Te1Doc**, the name of the overall document element, to **TDoc**, for "telecom document" or "technical document." THIS INVALIDATES ALL TIM 1 DOCUMENTS, but is very easy to fix.
2. Added **Admon** element for admonishments other than **Danger**, **Caution**, and **Warning**. This has no effect on existing TIM 1 docs.

2.3 Changes to Improve it, Based on Experience to Date

1. Now allow titled tables, implementing the full CALS table model. This has no effect on existing TIM 1 docs.

2. Made **TitleGroup** (a wrapper for **SuperTitle**, **Title**, **SubTitle**, and **ShortTitle**) optional when there is only a **Title**. This has no effect on existing TIM 1 docs.
3. Changed content model of **IndexEntry** to allow any level of nesting (indented entries in an index): **IndexEntry** may now contain nested **IndexEntrys** instead of explicit **Primary**, **Secondary**, and **Tertiary** subelements.
4. Changed the **Keycaps** element to **Symbol** with *type* values corresponding to the names of various nonalphabetic fonts: Symbol, Dingbats, Keycaps, KeycapExtras, Buttons, ButtonsLeft, ButtonsRight. THIS INVALIDATES A FEW TIM 1 INSTANCES.
5. Added *increment* and *shownum* attributes to elements with numeration attributes, to make it possible to represent more numbering styles. *Increment* is an unsigned or negative number indicating numbering like 5, 10, 15 or 5, 4, 3; "shownum='1 4 5'" means number the 1st item, the 5th, and every 5th item after. This has no effect on existing TIM 1 docs.
6. Added *align*, *valign*, *colsep*, *rowsep*, and *liststyle* attributes to **SegmentedList**, for tabular presentation. This has no effect on existing TIM 1 docs.
7. Added a *version* attribute to most elements to cross-reference an optional **Version** element in the **DocID** portion of the document. This allows version control within a single file in the style of the IBMIDDOC DTD.
8. Updated the NOTATION declarations and the *format* attribute. NOTATIONS specify what kinds of data formats may be included in a TIM document. Non-ASCII formats (GIF graphics, WAV sound files, etc.) must be in separate files. ASCII formats like PostScript and HTML may be included directly in an element in the TIM file, in which case the element's *format* attribute will specify the NOTATION.
 - a. Removed NOTATIONS for unlikely data formats:
 - CGM-CHAR (obsolete)
 - FAX (ambiguous, easily avoided, unacceptable raster-graphic format) and FAXTILE (believed obsolete)
 - PCX (easily avoided, unacceptable raster-graphic format)
 - CCITT-G3 (ambiguous, easily avoided, unacceptable raster format)
 - IndexText (no use known).
 - b. Added a notation for PostScript files.
 - c. Removed the "verbatim", "CDverbatim", and "RCverbatim" NOTATIONS, which wouldn't work as intended. TIM 1 tried to use "format", a NOTATION attribute, to specify that white space and line breaks should be preserved, but generally SGML applications do not base any such processing decisions on NOTATIONS. "format='verbatim'" would have been ignored without dire

consequences except to appearance. "format='CDverbatim'", meaning treat contents as CDATA ("&" and "<" are not markup), and "format='RCverbatim'", meaning treat contents as RCDATA ("&" is markup but "<" is not), could cause processing errors, because "&" and "<" would have been treated as markup anyway. The right way to do this in TIM 1 would have been to have a special element whose content model was defined as CDATA and another one for RCDATA. However, we can't actually make that correction now because those are not valid content models in XML. The only choices for literal data are:

- enclose it in a CDATA marked section (begin with "<![CDATA(" and end with ")>". This carries the slight danger that the string ")>" may occur in the data and be incorrectly interpreted as the end of the CDATA section.
- change all occurrences of "&" to "&#amp;" and "<" to "&#lt;" throughout literal data.
- keep the literal data in a separate file, give it an entity name, and call it in with an empty element (**ExternalText** in TIM).

The first two choices don't work for RCDATA. This may be a problem, but in practice there is no ASCII data format we know of that needs to be identified as RCDATA (that is, a format that uses "&" as markup without using "<" as markup; SGML, XML, and HTML use both, and some formats use "<" but not "&"). Overall, this change has overwhelmingly beneficial effects.

- d. Values for the *format* attribute were changed to those for NOTATIONS that could reasonably occur within an SGML data stream.
9. Now use **Contents** rather than **Section** to subdivide a **Contents** element, and **Index** for **Index**, allowing use of the special attributes defined for them at each level. THIS INVALIDATES SOME TIM 1 DOCS.
10. Gave **Frame**, **Graphic**, and **Object** additional optional attributes for specifying placement: *align*, *valign*, and *layer*.
11. Removed the **MarkList**, **DimList**, and **DimSpec** elements. HyTime (a standard model for hypertext links, followed in TIM) defines them for completeness but makes them optional and unnecessary in practice.
12. Changed **ListTerm** in **SimpleList** to **SimpleLI**, leaving **ListTerm** to be used only for the headwords in a **VariableList** (comparable to the Definition Terms in an HTML Definition List). This change has the potential advantage that automated processing can now locate all text content of a document in the **P**, **ListTerm**, and various title elements. THIS INVALIDATES SOME TIM 1 INSTANCES.
13. Split **PropStat** in **DocID** into **PropStat** (the heading of a proprietary-status message) and **PropMsg** (the text of the message), since they are used separately in many TelCo documents.

2.4 Changes to Make it a Better "Core Architecture" From Which Special-Purpose DTDs can be Derived

1. Removed the redefinable parameter entities that were intended to make TIM 1 easy to extend. It is now assumed that TIM itself will not need to be extended except for already-well-known general purposes (equation, procedure, requirement, flowchart, and/or memo markup). Those "handles" remain for extending the DTD without revising it, but others are removed. All local modifications will presumably be done by defining variant DTDs of the TIM "core architecture," with mappings to TIM using the *TIM2* attribute (see item 2). This removes the essential difference between the TIM and TIMM (TIM Minimal) DTDs, and also shortens the DTD, so there is a TIM 2.HDR instead of TIMM2.HDR, and no TIMM2.DTD at all.
2. Added an implied attribute *TIM2* to every element. This should be an attribute of every element in derived DTDs (such as authoring DTDs) so that the mapping to TIM 2 elements is explicit. It is not really needed in TIM 2 itself (the *remap* attribute should be used to specify how to turn TIM elements back into the authoring DTD's elements), but it is defined in TIM 2 so that it doesn't have to be removed in the transformation step. Example: Suppose an authoring DTD named BRTIM contains a **StepList** element that can be represented for interchange by the TIM **OrderedList** element. In BRTIM, the tag should say "<StepList ... TIM2='OrderedList' ...>"; in TIM, the tag should be "<OrderedList ... remap='StepList' remapto='BRTIM' ...>" (whether it also says "... TIM2='OrderedList' ..." is of no concern).
3. Added *remapto* and *remapatt* attributes to elements to identify the source markup that *remap* attributes refer to and any attributes (and their values) in the remapped-to DTDs that do not have analogs in TIM.
4. Made the **OrdListGrp**, **UnordListGrp**, and **VarListGrp** elements optional so that list structure can be more like that in most DTDs; the same was not done for **SegListGrp**, since it is analogous to the required **TGroup** in tables.
5. Eliminated the **TermTitle**, **MarkTitle**, and **LITitle** elements used for headings over list columns; as a replacement, changed **SegHead** to **ListHead**, with a content model of (Title+), and now allow it for all four list types. THIS INVALIDATES A FEW TIM 1 DOCS.
6. Added **MTextType** to **DocID** as a required element (replacing the one required **Status** element with something easier to process); also added **CDocType** and **DraftStatus** as optional elements for convenience. **MTextType** identifies the exact version of TIM used to mark up the document. **CDocType** tells what file format is provided as the "canonical document" (the electronic version that matches the printed copy); it would usually be PostScript or PDF. **DraftStatus** is a specific status message that often prints in the document header or footer. THIS INVALIDATES EVERY TIM 1 DOC, in a way that's easy to fix.
7. Removed **DistSegLI** (distributed segmented list item) as unnecessary. As far as we know, this does not invalidate any existing TIM instance.

8. Reduced the list of ftp/http sites for downloading revisions of the DTD (included in a comment in the DTD) to the 3 best- maintained: the TCIF site first, the other two mirrors).