# W3C Coordination

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# 1 MathML2

Since the end of the earlier OpenMath project, the major event for MathML2 has been the issuing of the MathML2 Recommendation (21st February 2001) .

# 2 Re-chartered Math Working Group

After the completion of MathML2, the Charter for the Working Group expired. The W3C agreed to re-constitute the Working Group, with a charter as outlined at the end of this document. Unlike the first two math working group charters, where the main aim of the working group was seen as producing a specification of MathML (MathML 1 and 2, respectively), the third charter (which lasts for two years) enables the Working Group to work mainly towards encouraging implementation and take up of the existing recommendation. It should be noted that liaison with the OpenMath Society and European Funded OpenMath consortia is explicitly mentioned in this charter.

# 3 Web Services

The Math Working Group has set up a subgroup to investigate the use of MathML for mathematical web services. This is expected to liaise with the more general web services activity that has recently been started by the W3C http://www.w3.org/2002/ws/ (started, 25th January, 2002). There is again expected to be close liaison with the OpenMath community many of whom are also working towards the delivery of online mathematical services.

# 4 Meetings

There has been one face-to-face meeting of the new working Group, in June 2001 at IBM's New York offices. The next face two face meeting will be aligned with the W3C plenary meeting in Cannes February 2002 (which will be immediately followed by an OpenMath thematic Network meeting in Nice) and with the second public MathML conference to be held in Chicago in June 2002.

# 5 W3C Math Working Group Charter

The W3C Process Document describes what is required for a Working Group's charter. Its guidelines are followed here.

Mission Statement The Math Working Group is chartered to continue the task of facilitating the use of mathematics on the Web, both for science and technology and for

education. This involves the maintenance of the recent version 2.0 of the MathML specification (W3C Recommendation, 21 February 2001), encouragement of its wider deployment, preparation of any revisions or addenda appropriate, continued liaison with other Working Groups within the W3C to ensure that the potential of MathML is realized, and relations with other organizations, all designed to strengthen the position of MathML and enhance the use of mathematics on the Web. MathML can be of value as a test case in the deployment of some of the newer W3C initiatives.

This means that the use of MathML in Web documents is encouraged by the W3C, to which the MathML specification belongs, and should significantly contribute to the usefulness of the Web for science, technology and education. The continuation of the work on mathematics on the Web falls within the scope of the User Interface Domain.

Scope

- Maintaining and clarifying the MathML 2.0 Recommendation.
- Ensuring ongoing compatibility between MathML and the new and evolving W3C specifications.
- Working with other W3C groups to develop generally applicable solutions for XML in preference to specific extensions to MathML.
- Encouraging development of software that facilitates the creation, display and use of documents using MathML for mathematics. Examples are visual and audio browsers, translators from older encodings (such as TEX and ISO 12083), tools (possibly using customized input syntaxes) and editors.
- Employing MathML in appropriate contexts to express mathematics in W3C specifications.
- Developing mechanisms to improve on any deficiencies noted in the use of MathML.
- Preparing possible revisions and addenda to MathML.

Criteria for Success

- Maintenance of the W3C Math site pages as a center for information on the deployment of MathML, a W3C product, including an up-to-date Implementation and Interoperability Report.
- Maintenance of the Test Suite and Validation Services for MathML provided at the W3C site, and of the associated Compliance Document.
- Preparation of reports on updates to MathML containing improved features, and of addenda to the specification as necessitated by developments at the W3C or outside.
- Continued full compatibility of MathML with relevant W3C specifications which are still evolving.
- Expansion of acceptance and use of MathML, as measured by the number of products released supporting its features.
- Promotion of the essential role of MathML for communicating math through the Web, and its employment in the production of mathematically rich documents and services. The success of this can be measured by its spread online.

Duration

This group commences in May 2001 and is scheduled to persist 24 months, terminating at the end of May 2003.

Deliverables

The group will create Working Draft documents which contain specifications for updates or extensions of the MathML specification and use of mathematics on the Web.

- A schema for MathML
- An outline of modularization of MathML
- a system for profiles in MathML
- adjustment to the MathML Test Suite
- clarity on the implications of this for MathML's extension mechanisms
- Presentation and Content markup updates
- Guidelines for graphics and MathML
- A DOM API for MathML Revision
- Spoken mathematics using XSL Style Sheets (Voice XML)
- Examples of Web Services for Mathematics using MathML (XML Protocols)
- Tutorial and introductory materials to encourage adoption of the MathML specification.
- Guideline documentation for implementors of MathML.
- Promotional activity and materials on behalf of MathML.
- Minutes of telephone conferences and face-to-face meetings.

The group will produce a Proposed Revision of the MathML Recommendation, evolved from stable Working Drafts, and will put that forward for consideration as a W3C Recommendation, if that proves appropriate.

Minutes of teleconferences and face-to-face meetings will also be available from the WG page.

Release policy

The work of the Working Group, and in particular, its document production will be in accord with the guidelines set down in the W3C Process documentation.

Relationship to other forums within the W3C

**Hypertext Coordination Group** The Math WG will coordinate its work at a high level with other Working Groups primarily through participation in the Hypertext Coordination Group where it is represented by its chair(s).

**XML Coordination Group** The Math WG will coordinate its work in the XML sphere through participation in the XML Coordination Group, which is intended to improve communication beyond the level the previous Math WG achieved.

**XML Working Group** The Math WG is naturally affected by changes to XML syntax. MathML is written in XML 1.0, with the addition of XML namespaces. MathML is presently described by a DTD, which should be replaced by a schema with at least equivalent value. However, the MathML specification would benefit from being supplemented by a schema able to express formally more of the constraints presently only expressible in the prose of the specification. For this reason the Math WG has a strong interest in cooperation with the XML Schema WG, which has already started. The topics of data types, replacement of character

entities and structural expressions are all on the table. In addition, the details of the deployment of namespaces and MIME, which are within the purview of this WG, types have implications for the embedding of MathML in browsers that are relevant today. The MathML revision format will use the results of XLink group working on linking for internal hyperlinking, linking into and out of mathematical parts of a Web document. The expansion of the capacities of linking and querying may interact with MathML. Whether the mathematics of XML Encryption can usefully be expressed in MathML is to be investigated, in the W3C spirit of using its own recommendations. There are already on the Web a number of mathematical services: it seems entirely appropriate to set out their Discovery, Description and Service Integration according to the developing XML Protocols.

**Document Object Model (DOM)** MathML content is accessible from the XML Document Object Model. The Math WG is directly concerned with some details of the DOM. The previous Math WG has made some of MathML's natural requirements known and representatives collaborated on a DOM. Such work will continue especially on the Embedded DOM model.

**W3C Web Accessibility Initiative (WAI)** The work of the Math WG was from the start intended to be helpful in promoting the wider accessibility of math, and MathML 1.0 was designed with that in mind. It is hoped that now a real implementation of a non-visual renderer for MathML can be achieved through collaboration with the WAI WG and suitable implementors. This goal has proved to be a long-term one, although there are already demonstrations of some non-visual rendering of formulas based on MathML. However voice rendering of mathematics is now ready to be done.

**CSS & FP Working Group** The Math WG continues to look to the style-sheet mechanism under development for platform independent rendering of MathML. There are demands upon CSS&FP implicit in the requirements for MathML. Members of the previous Math WG participated in the inter-WG Style Task Force and this will continue.

**XSL Working Group** The Math WG looks to style-sheet mechanisms for platform independent rendering of MathML. Again, there are demands upon XSL implicit in the requirements for MathML. Of particular interest in XSL are the scripting and macro mechanisms planned. Suggested FOs for mathematics have already been put forward. The XSL Requirements Summary anticipates support of MathML.

**SVG** The use of graphics in mathematics is commonplace at all levels, yet the Math WG in developing MathML consciously left aside dealing with drawing for mathematics. Many in the community clamored for it, and the WG did consider the questions early on, but decided that resources did not permit addressing the need. With the successful development of SVG, presently a W3C Candidate Recommendation, many of the tools to do graphics for mathematics seem to be at hand. How these are to be integrated with XHTML and MathML in practice remains to be worked out in detail. The WG will need contact with the W3C Graphics activity, and in particular SVG and any corresponding group working on three-dimensional graphics specification.

**Semantic Web Activity** This new initiative of the W3C offers more opportunities to use the formal structures of the RDF to try and capture more of mathematics at levels above that of a single formula, which is what MathML in essence addresses.

**I18N Working Group** Mathematics is an international language, and may be incorporated in documents in all natural languages. The Math WG must cooperate with the internationalisation efforts of the I18N Working Group. The character model settled upon is important to mathematics. If examples of the use of mathematical notation in conjunction with bi-directional writing systems are found which are not fully compatible with MathML 2.0 then attention will be given to their requirements.

Relationship to forums outside the W3C

The Math WG coordinates its work with other groups or organizations insofar as they may be directly concerned with mathematics on the Web, or as their activities may have a direct impact on the usefulness of MathML.

**The Unicode Consortium and ISO WG2** The Unicode Consortium and ISO WG2 have already been very responsive to the needs of mathematics on the Web, and additions to Unicode and ISO 10646 are expected in versions 3.1 and 3.2 that have been made expressly for mathematics on the Web. Coordination with these groups will continue.

**OpenMath** The OpenMath community, based around the OpenMath Society, and its contracts under the European Community's ESPRIT project contributed measurably to the development of MathML 2.0. Contact with this community will continue.

**The TEX Community** The previously dominant composition system in the academic community has been TEX. In fact TEX can work well with MathML, either as an input syntax which is widely known, or as a mathematical composition engine with which much experience has been gathered. The TEX Users Group and the LaTeX3 project will be kept informed of progress on the MathML front. Fonts from the TEX community may be helpful in rendering MathML in browsers. Projects for the conversion of legacy TEX material to MathML have already been started, but are not yet of 'production quality'.

**IEEE LTSC** The IEEE Learning Technology Sub-Committee has approached the W3C Math WG with the idea that they might endorse MathML as the preferred standard for mathematical encoding in their standards. This avenue of cooperation, which has the potential of helping the spread of MathML within the US educational community will be explored. The LTSC also has done work on mathematical metadata, but not in exactly the RDF model.

**STEP** There is a large initiative supported by ANSI which aims at formalizing the exchange of scientific, technical and engineering information for manufacturing. In fact their section 50 is a way of transcribing mathematical material, mostly geometrical. Its relation to the Recommendation of MathML should be understood, and cooperation with the STEP initiative, which is part of ISO standardization, undertaken if appropriate.

**STIX** The STIPUB group of Publishers of Scientific and Technical Information is making available a public set of fonts to cover all those characters in Unicode needed for their publishing needs. We need to remain informed of their progress.

**XMath** An cooperative European effort of this name has been set up with the intention of promoting training and education in the use of the Web for education in mathematics, and in particular in MathML. Liaison with XMath is obviously desirable. Perhaps they will be able to help with the public educational materials

needed. Note this is not to be confused with other products and projects with very similar names.

**Web3D** This consortium has been developing an XML version of VRML, a markup for three-dimensional graphics. The Math WG was approached by them because of the obvious interest of mathematics in such advanced graphics, and of the mathematical nature of the descriptions of surfaces and higher-dimensional objects.

Milestones

One or more public Working Drafts will be produced covering each of the Work Items, tentatively to the following schedule:

| Year | Month | Document or Event Revision |
|---|---|---|
| 2001 | May | Math WG Start |
| 2001 | Jun | Math WG Kickoff Meeting - N. America |
| 2001 | Jun | MathML Implementation and Interoperability Update 1 |
| 2001 | Aug | MathML User and Implementation Primer WD 1 |
| 2001 | Aug | MathML Revision WD 1: Schema |
| 2001 | Sep | MathML Test Suite Update 1 |
| 2001 | Oct | Math WG Face to Face Meeting - Canada |
| 2001 | Nov | MathML Revision WD 2: Modularization |
| 2002 | Mar | MathML Revision WD 3: DOM API |
| 2002 | May | Second MathML User Community Conference Meeting |
| 2002 | Jun | MathML Web Services WD 1 |
| 2002 | Aug | MathML User and Implementation Primer WD 2 |
| 2002 | Sep | Math WG Face to Face Meeting - Europe |
| 2002 | Nov | MathML Revision WD 3: Presentation and Content Modules |
| 2003 | Mar | MathML Spoken using XSL Stylesheets WD 1 |
| 2003 | Mar | MathML Test Suite Update 2 |
| 2003 | Mar | MathML User and Implementation Primer WD 3 |
| 2003 | May | MathML Revision Final Specification<br>includes final forms of all components |
| 2003 | May | MathML Test Suite Final Update |
| 2003 | May | MathML Conformance Document Final Revision |
| 2003 | May | MathML User Primer Final |
| 2003 | May | MathML Implementation Primer Final |

Note that the schedule given necessarily cannot foresee all that will come out of the work done by the WG, and that it does not take into account the phases of putting forward a specification for consideration as a W3C Recommendation. The decision to offer such will have to be taken by the new Math WG after a time of work. It might be that another way of adopting revisions to MathML will be more suitable.

Meetings

Three face-to-face meetings will be arranged. Meeting details will be made available on the W3C Member Calendar and from the WG page. In addition a second conference involving the user community will be held, a sequel to the very successful one in October 2000.

Meetings:

New Math Working Group Kickoff: June 2001 - East Coast North America Working Group meeting: October 2001 - Canada Second MathML User Community Conference: May 2002 - Midwest North America Working Group meeting: September 2002 - Europe Communication Mechanisms Email The archived member-only mailing list w3c-math-wg@w3.org is the primary means of discussion within the group. Postings to this list are Member confidential, as is the Working Group page, but not the WG charter.

The archived mailing list www-math@w3.org is used for public discussion of mathematical markup and related issues, and WG members are encouraged to subscribe. In a phase of expanding adoption of a specification it is essential that the Working Group be organized so that responses on the public mailing list are timely and helpful.

Web

There is a public page on W3C Math Activity, maintained by persons designated by the chair. It tracks the evolving use of MathML, and supports it with information on implementations, FAQ, and access to the MathML Test Suite and Validator. There is also a private Math Group page, maintained by the chair.

Phone

One-hour phone conferences are held at least bi-weekly. Both US and French numbers are made available. These two bridges are joined together to create a single teleconference.

Voting Mechanisms

The Group works by consensus. In the event of failure to achieve consensus, the Group may resort to a vote as described in the Process Document. If the issue is resolved by consensus during the voting period, the vote is cancelled.

Participation

Participants (W3C Member representatives, Invited Experts, and W3C Team members) are required not to disclose information obtained during participation, until that information is otherwise publicly available.

by W3C Members

Requirements for meeting attendance and timely response are described in the Process document. Participation (meetings, reviewing and writing drafts) is expected to consume time up to one day per week.

W3C Members may also offer to review one or more working drafts from the group for clarity, consistency, technical merit, fitness for purpose and conformance with other W3C specifications. They are required to provide the review comments by an agreed-upon date but are not required to attend meetings.

by invited experts

As decided on a case-by-case basis, invited experts may attend a single meeting or a series; they may in some cases be subscribed to the Group mailing list. For the duration of their participation, invited experts are encouraged to adopt the same requirements for meeting attendance and timely response as are required of W3C Members.

by W3C Team

W3C team ensures that the mailing lists and Group page are adequately maintained and that public Working Drafts are made available on the Technical Reports page. A

W3C team member provides liaison between any non-team document editors and the W3C team.

W3C team are expected to adopt the same requirements for meeting attendance and timely response as are required of Working Group Members. The expected commitment from the W3C is therefore at least 20of a full time person, plus 5

At present Max Froumentin is providing the support and liaison mentioned here.

Intellectual Property Rights

The proceedings of the Working Group are conducted in an open working environment in accordance with the W3C's policy on intellectual property (IPR) issues

Members of the Math Working Group, and of any other Working Group constituted within the Math Activity, are expected to disclose any intellectual property claims they have in this area. Any technology essential to implement specifications produced by this Activity must, at the very least, be available for licensing on a royalty-free basis. At the suggestion of the Working Group, and at the discretion of the Director of W3C, technologies may be accepted if they are licensed on reasonable, non-discriminatory terms.

Members disclose patent and other IPR claims by sending email to an archived mailing list that is readable by Members and the W3C team: patent-issues@w3.org. Members must disclose all IPR claims at least to this mailing list.