The Principles Behind ETSI's

New Working Methods

Initiative

An Innovative Concept for Collaborative Drafting of Documents

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Where are the horses?

When change happens, it can happen fast. It may be predictable, it may not but if it is it would make sense to ask the question: *shall we be part of it or just let it happen around us*? Consider New York in the year 1900 when 5th Avenue was a bustling thoroughfare filled with people, coaches and horses[3)].

Thirteen years later, where are the horses?

Figure 1: New York in the 1900's

Or a more recent example. In January 2010 Uber went from a trial run of three cars to an official launch and a multi-million-dollar funding series in the same year. In a period of less than 6 months the taxi industry was changed for ever.

The point we wish to note here is not just the direct effect these innovations had on the horse and carriage business or the taxi industry but also on their users as a whole. As a result, commuters had access to more efficient and cheaper travel, more flexibility, more mobility, more connectivity. The motor car and later agile services such as Uber became enablers for their customers to achieve so much more beyond the initial purpose of travel.

One of ETSI's strategic objectives, *Being an Enabler of Standards*, talks about providing the very best processes, methodologies and tools to enable the ETSI members to draft and publish the very best technical standards. Today, industry generally, and many ETSI members in particular, are looking at novel ways of collaborative working, especially the effective drafting of documentation.

ETSI itself may need to do likewise. We have been drafting our deliverables in much the same way since 1988. Is it time to consider a change? The New Working Methods (NWM) project is a response to this question. It is an initiative for ETSI to be a world-leader in the use of up to date standardization drafting approaches and tools.

But let's not put the cart before the horse, so to speak. ETSI has a very successful record in the collaborative production and publication of its deliverables[1)]. In 2017 alone 384 face-to-face technical meetings were held at ETSI premises, involving over 7000 delegates. 3 479 online meetings took place, involving over 30.000 participants. Nearly 20 000 contributions were uploaded to the Portal and document production totalled around 400 published deliverables.

NOTE 1: For simplicity the term *standard* or *deliverable* is used to mean any ETSI document of the sort EG, GR, TR, SR, GS, TS, ES or EN (or HS).

In the same year, more than 16 000 3GPP delegates participated in 139 meetings, produced 100 000 T-Docs and approved well over 9 000 Change Requests. ETSI publication of 3GPP specifications totalled around 2 350 deliverables.

So why change? By any measure, this is a lot of drafting and the pressure on ETSI technical groups[2)] and the Secretariat to publish high-quality standards ever faster is growing. To echo the words of several technical group chairs "*We have more work, more meetings, more documents, more complexity, more travel but with less and less resources and time available. Help!*"

NOTE 2: The term *technical group* is used to mean any of the following: TB, TC, EP, EPP, ISG or SC.

By taking advantage of modern drafting approaches NWM hopes to achieve the following aims:

- To help ETSI technical groups to work as efficiently as possible;
- To enable increased throughput by the ETSI Secretariat;
- To ensure the highest editorial and technical quality of our Deliverables;
- To facilitate closer integration with ETSI member working practices;
- To give ETSI Deliverables an added value for end-users;
- To be attractive to the next generation of standardizers and external organizations.

As a starting point we have considered recent advances in the publishing industry as well as new approaches being discussed, and in many cases starting to be implemented, by other SDOs and fora.

We have also looked at the working methods of OSS (Open Source Software) projects and asked the question: "*Can we treat standards development as if it were software development (in terms of process)*?" This is not meant to imply that standards development becomes an Open Source activity, rather seeing if we can adopt practices such as the systematic collection of issues, short development cycles, automated integration of modified text into a baseline and the use of OS development platforms (albeit adapted for the production of text rather than code).

While the analogies above may be somewhat light-hearted there is a serious understanding that we are in the centre of an ongoing global evolution in collaborative working and document production.

This paper describes the ETSI Secretariat's intention to be part of this change.

Note 3: *Where are the horses?* was inspired by the BBC article: https:/www.bbc.com/news/business-45786690. An interesting read in itself.

ETSI's business is drafting and publishing standards

The following sections take a closer look at the concepts and philosophy behind NWM. As a starter, it is worth reminding ourselves of the well-established ETSI Standards Making Process (SMP) as illustrated in Figure 2.

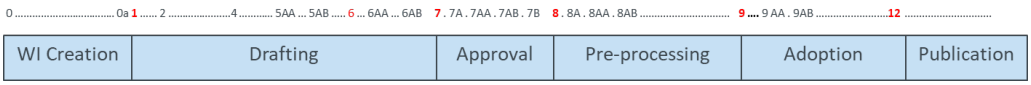

Figure 2: Current ETSI Standards Making Process (simplified)

The major standards monitoring milestones (0 – 12) are partially indicated to show their approximate position in relation to the figure.

Figure 3 shows that the early focus of NWM directly impacts the Drafting and technical group Approval phases of the SMP. In later implementations NWM will impact WI creation, Document Processing and Document Publication. At this time NWM is not intended to address the Adoption procedures of the various ETSI deliverable types.

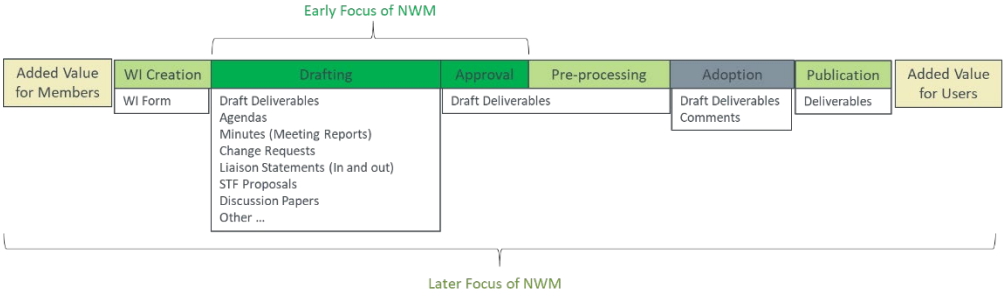

Figure 3: Initial scope of impact of NWM on the SMP

We shall see later that NWM can encompass the drafting process *as is* but the overall goal of the project is to move towards other ways of working. Most importantly, NWM has the potential to change radically the actual process of drafting. In fact, NWM could even apply to drafting documents outside the ETSI technical groups, for example when used internally by an ETSI member to provide input to standards or as an integral part of their own development processes.

Figure 4 illustrates a typical ETSI meeting cycle within the drafting phase, as described in the ETSI Technical Working Procedures (TWP).

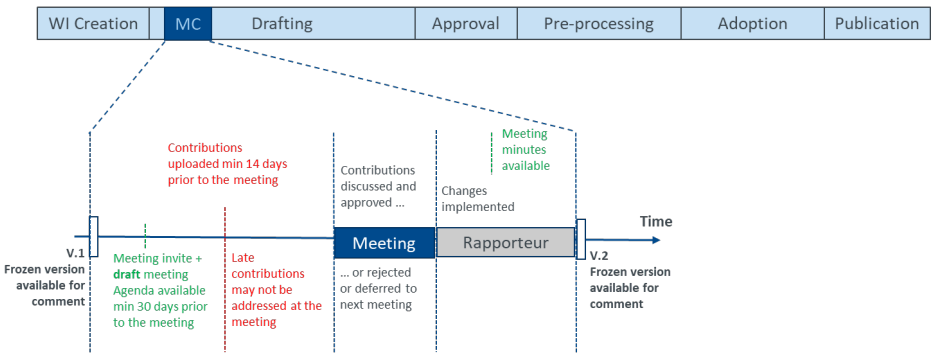

Figure 4: Illustration of a meeting cycle as described in the ETSI TWP

While the TWP give a formal framework in which a technical group meeting, for example, will occur it says very little about the how the drafting actually happens (beyond stating that formal change control is at the discretion of the technical group). As long as essentials such as deadlines, transparency, consensus (or voting), adequate meeting minutes (traceability), IPR Policy etc. are followed then the actual drafting approach is the prerogative of the particular technical group.

No standard develops in isolation. Input to the drafting process comes from a huge variety of sources, either directly or indirectly. ETSI needs to be at the centre of that input. Not as a tangential activity. Not separated from designers, developers and testers but as an integral part of their daily activities.

We believe NWM can go some way to help make that integration easier, perhaps even seamless.

In an age of collaboration, fast turn-around and remote working one can ask questions of the number of meetings, the duration of meetings, the need for physical meetings or even the need for 'traditional' meetings at all. As we shall see, the philosophy behind NWM accommodates a high degree of flexibility with respect to these parameters, while not advocating any particular choice.

Thus, the decision of which is the best process at any given moment for any given document or situation is left open. In short, the NWM philosophy is to have the *right* process for any given well-defined drafting context. One size does not fit all.

The NWM Approach

Is There a Generic Drafting Process?

In itself, drafting is not a difficult endeavour, it is 'simply' taking a document from one content state to another.

> NOTE: The term *document* is used in a general sense to mean any document involved in standards-making (including deliverables) such as agendas, meeting reports or minutes, liaison statements, ToRs, discussion documents, white papers or even a list of a particular committee's favourite restaurants!

We shall call these different document states *variants.*

A **Variant** is a linked modified copy (child) of a base document (parent)

Of course, in the case of standardization, drafting is a highly complex activity due to the need for deep technical discussion, transparency and the desire to reach consensus, often among many hundreds of players and in a highly market-sensitive context. Nonetheless, we believe there are some fundamental characteristics of *any* consensual drafting process, which we list below:

- Well-defined roles (responsibilities, permissions etc.).
- Submission of proposed modifications (by some means).
- Review of the proposed modifications (by some means).
- Decisions based on the proposed modifications.
- Actions taken as a result of those decisions.
- Integration of the (accepted) modifications into the baseline.

- Time (synchronisation points, durations, deadlines etc.).
- Quality control (editorial & technical, progress oversight etc.).
- The ability to split work off into sub-processes.
- Traceability of actions, decisions and proposed modifications.

The NWM Conceptual Model

The NWM conceptual model takes these characteristics and reduces the drafting workflow of any document (variant) to a cycle that has three main phases, with potential *decisions* and *actions* being taken during any of those phases. Other parameters include Timing and document Quality. This is illustrated in Figure 5.

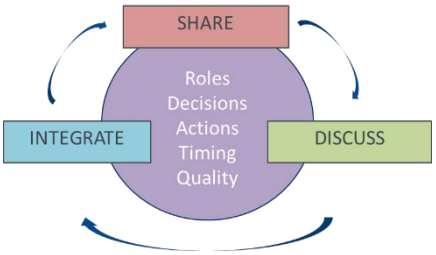

Figure 5: The NWM Conceptual Model

Figure 5 is neither a literal process diagram nor a state diagram. It is simply a model on which we can hang some concrete ideas. However, by sticking to these concepts when thinking of existing or new processes and when implementing NWM tool support we have found that we can achieve a consistent philosophy across many different scenarios.

The conceptual cycle can apply, say, on the meeting level as well as to individual variant cycles (e.g., within a meeting cycle). The cycle of SHARE – DISCUSS – INTEGRATE may be iterative and is often recursive (e.g., variants of variants). Iterations can be small (hours or days) or long (weeks or months). The approach does not impose cycle limits beyond what a given context may demand.

We have purposely used neutral terms for these phases. In the current ETSI SMP, for example, SHARE could mean uploading a contribution, possibly a Change Request (or CR), to the ETSI Portal, DISCUSS is the open debate and review of the contribution in a WG meeting and INTEGRATE is the implementation of the agreed changes into the baseline by the Rapporteur (after the meeting).

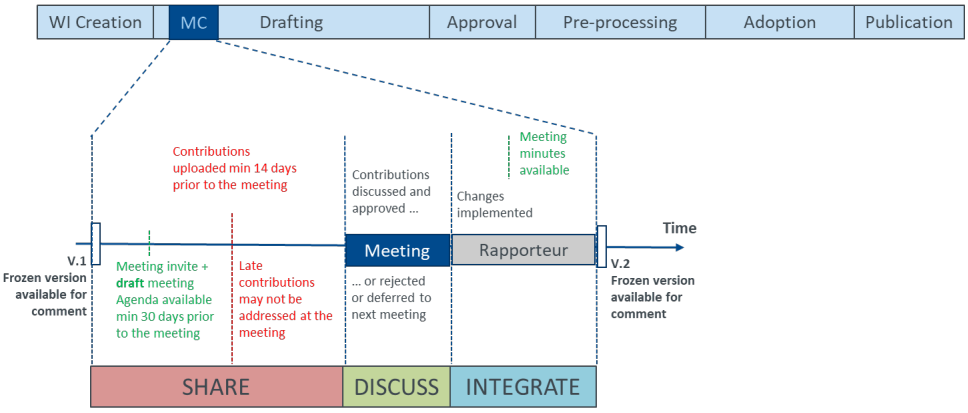

Figure 6: The SMP meeting cycle in relation to the NWM phases

Drafting processes do not have to be strictly meeting based, in the traditional sense of the word. Open Source projects may talk about committing code to the project repository (SHARE), online review of the code with -1/+1 opinions (DISCUSS) and subsequent merging of the new code into the main branch (INTEGRATE). This is a continuous process, with actual meetings few and far between.

Of course, phases may be skipped (though a completely empty cycle makes no sense!). For example, a particular variant may be rejected in the DISCUSS phase in which case no INTEGRATE occurs.

Putting the Model in Context

The drafting cycle can occur in many different contexts. This is illustrated in Figure 7.

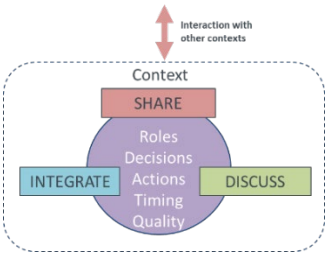

Figure 7: Drafting cycles exist within a given Context

In most cases, context can be identified as a type of *group*, but it may also apply to an individual. We shall use the terms group and context synonymously in this paper. However, context is further refined by giving values to the various characteristics listed earlier (such as roles, types of actions or decisions). It will also depend on parameters such as the document type or the maturity (status) of that document.

The NWM model obviously applies to Technical Committees and their Working Groups but also to others (both formal and informal), such as Contributor Groups (e.g., internal to an ETSI member), Breakout Groups (perhaps an ad hoc group in a WG), ETSI Specialist Task Forces or Secretariat Groups such as the ETSI Document Processing Centre (DPC) or test suite developers (CTI).

We can illustrate some of these groups as follows:

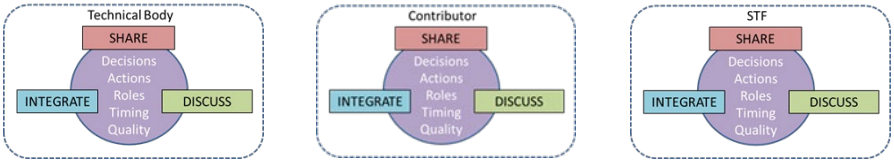

Figure 8: Examples of different context groups

Note that interactions (sharing) may need to happen between groups that may be drafting variants either synchronously or asynchronously. For example, in the DISCUSS phase it may be necessary to create a Breakout Group to resolve a particular technical issue. Or in the INTEGRATE phase a quality check may need to be performed by the DPC. The current variant is then shared to the other groups, as appropriate.

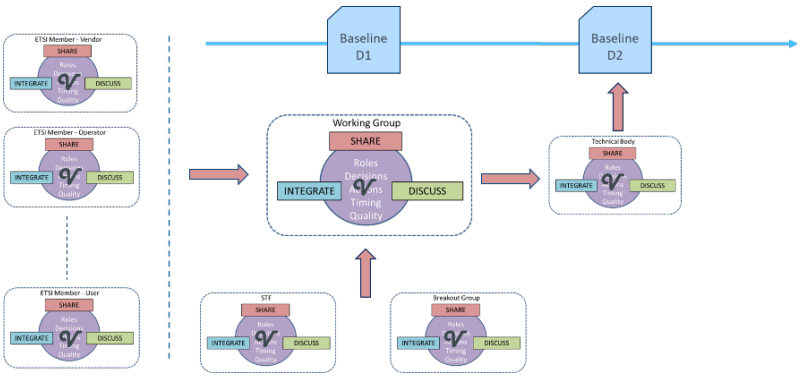

Figure 9: Example of interactions between groups

In Figure 9 we show a scenario where ETSI members draft and SHARE their variants of the baseline asynchronously with the WG. There may be a long-running STF working on parts of the baseline, or a WG ad hoc group working over a few hours to resolve a specific issue. The WG will have its own cycles to discuss and integrate these different variants, sharing among itself until ready for, say, a final review by the technical group plenary which will have its own (hopefully shorter) cycle resulting in formal approval.

Most (formal) drafting processes need to consider time, usually as *deadlines* (e.g., latest upload of contributions) or *durations* (e.g., of a work session or meeting). In NWM terms these would be the deadline for the end of a SHARE phase or the duration of a DISCUSS phase.

The model also anticipates *sync points* with other contexts (for example waiting on a SHARE from a breakout group or STF).

Continuous Development and Integration

The conventional SMP (meeting based and batch-oriented where a large number of documents are handled over a period of time) can be accommodated by NWM but the model also facilitates the scenario where groups can focus not on meeting schedules but on continuous individual document drafting, as illustrated in Figure 10.

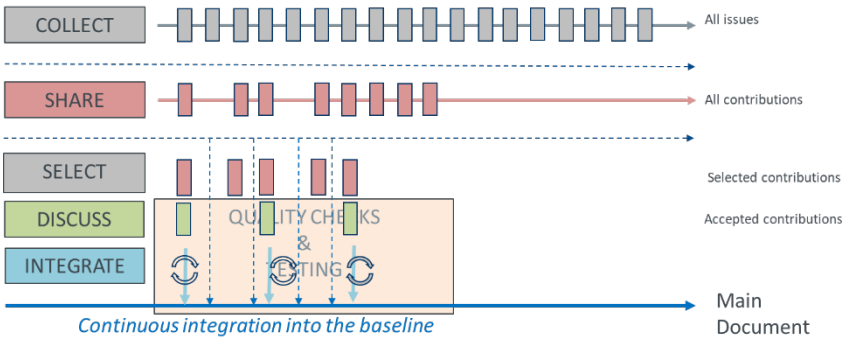

Figure 10: Continuous Development, Quality and Integration

This concept of *continuous development and integration* is one lesson we may usefully learn from the Open Source community, where issues are collected and handled in smaller chunks. If adopted by ETSI technical groups this would be a significant change in terms of process and optimization.

Changing the process

The application of continuous development and integration will have a significant impact on the way ETSI deliverables are developed, as illustrated in the following scenarios. The larger circles in these figures represent batch-mode working, usually in F2F meetings. The smaller circles represent cases where fewer or even individual issues are shared, discussed and integrated in a single cycle. Note that in all cases NWM brings the added advantage of continuous quality assurance and that the scenarios successively make time-efficiencies (or allow more issues to be processed).

Meeting based activity

Figure 11 represents drafting based on strict meeting cycles with sharing of contributions prior to the meeting, discussion and approval of changes (variants) during the meeting and integration of these changes after the meeting. This is largely how ETSI groups work today. There may be some interim collaboration but this is not necessarily coordinated or particularly intense.

Figure 11: Meeting-based development

Meeting based with interim activity

Figure 12 represents drafting based on fewer meeting cycles with significant collaborative activities between meetings. As the process is transparent to the whole group formal decisions may be taken (e.g., the approval of non-contentious changes) in the interim. Major discussion and decisions could be left for the scheduled meetings to address, for example (final) approval of the resulting variants, or of particularly complex technical issues.

Figure 12: Meeting-based development with interim collaboration

Continuous activity

Figure 13 represents a continuous drafting activity with no physical meetings, and short cycle times (rapid approval and integration as issues are addressed). There is no concept of interim meetings. Final approval of a deliverable (e.g., a Release) may require a physical meeting.

Figure 13: Continuous development

Continuous activity with extensive parallel break-outs

Figure 14 also shows continuous drafting but with work split into parallel flows and eventual merges. Formal decisions may be taken in parallel groups.

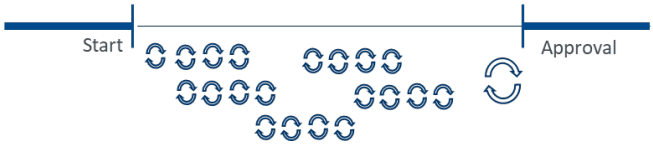

Figure 14: Continuous development with break-outs

NWM Tooling and the in-document Experience

Tooling for NWM is based on a modular architecture with incremental evolution of a toolset as needs and resources allow. The internal document formats enable the manipulation of the content to provide added-value functionality, such as comparing documents or tagging of various document elements (such as requirements). An open API will even allow external developers (primarily ETSI members) to add their own plugins to allow customized extensibility.

As stated earlier, the underlying focus has been on enabling new drafting processes and adaptive workflows. More of processes later, but as an introduction we shall start by taking a look at potential NWM tooling from the user's point of view, namely the *in-document-experience*, where most user interaction takes place.

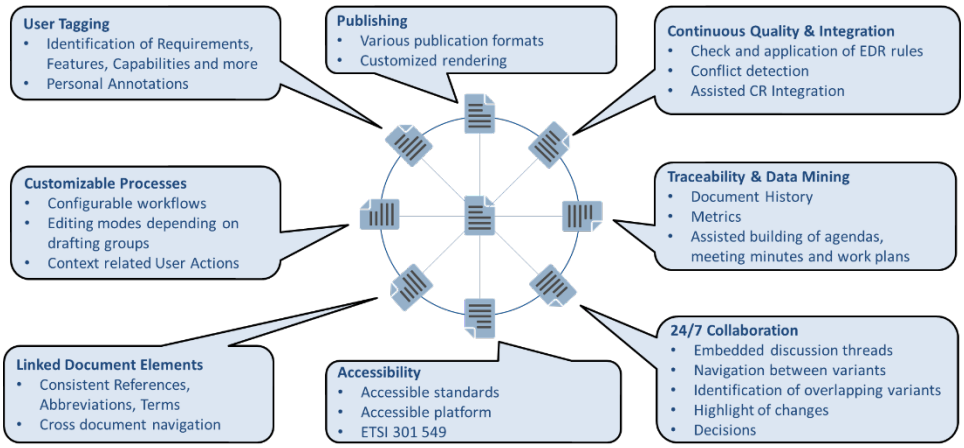

Figure 15: The User In-document Experience

The functionalities illustrated in figure 15 are just a few of the possibilities, many of which will be available in early releases:

24/7 Collaboration

For ETSI members, collaborative working means easy sharing of documents (variants) and being able to review, comment and provide feedback or requests for clarification. It must also facilitate (formal) proposals for modifications (changes), allow discussion around those changes and (formal) acceptance (or not) of those changes. It must be possible to do this on a large scale, in real-time on-line or in face-to-face meetings.

> Example: A chairperson could use appreciations (opinions such as *agree* or *disagree*) of particular comments to prioritize agenda items for upcoming meetings or to instigate a breakout meeting to resolve a particular issue.

In-document discussion is a powerful facility to provide an alternative to email discussion threads. Appreciation (opinions) of comments and contributions allows reviewers to provide fast and easy feedback and helps authors and officials to gauge the extent of issues and level of consensus.

Users can continue to work when in Disconnected Mode (with a limited set of features) and will automatically synchronize once they are online again.

Continuous Quality and Integration

Tool-assisted integration (or merging) of new text (i.e., variants) into parent documents (variants) will be possible.

> Example: A Rapporteur could rapidly generate a new version of a document with all non-conflicting changes (variants) integrated.

The merge capability includes the detection of conflicts for different pieces of text that may apply to the same paragraph. In the case of such conflicts a guided workflow will assist in the resolution of the conflicting contributions.

The early detection of conflicts encourages contributors to resolve issues prior to bringing their proposals to a wider audience. Previously consolidated ideas and early conflict resolution will help speed up the process of reaching consensus. Version control allows users to revert back to previous content or to see differences among different versions of a document, thus providing a transparent record of the applied changes to each version.

In recent years the Secretariat has made advances on the quality of ETSI deliverables through training of TB officials and delegates as well as Secretariat staff (as summarized in the brochure *Writing World Class Standards [2]*). NWM tooling will take this to the next level by facilitating automated checks or even the direct application of the ETSI Drafting Rules. It will be possible to apply different levels of quality, which may simply be warnings, suggestions or even actions that must be taken before progressing to another stage.

> Example: A technical group can decide that variants must have passed the EDR check before they can be considered for decision.

Linked Document Elements

ETSI Deliverables contain many elements that can be recognized and linked accordingly, such as abbreviations, definitions and references. Pull down lists of these elements, for example, will enable easy cross-document navigation and result in a consistent and correct use of those elements.

The reader of a document will be able to go to referenced sections or elements (such as tables, figures and notes) within the document itself as well as within other documents.

> Example: When drafting a document NWM tools will detect when a reference is created and will propose to link it to the appropriate document.

User Tagging

Apart from the recognized elements users will be able to tag more complex structures such as technical requirements. As a consequence, these tagged elements could be highlighted in the document or even numbered and extracted as a separated list.

> Example: Requirements could be tagged and listed as mandatory, optional or conditional and used as input to product procurement, development or testing.

Personal annotations allow the user to make private comments (such as sticky notes or to-do lists). Private comments can be made public if wanted.

Traceability and Data Mining

The NWM tools preserve the entire evolution of a document by capturing information such as the agreed and rejected proposals for change (variants), the related discussion threads and subsequent decisions and actions. This allows users to go back in time and follow the actions and decisions that led to any given version of a document.

> Example: All variants that were implemented in a given version of a base specification or all related comments or decisions can be retrieved.

All embedded data resulting from the drafting process is available to the user and, as an added value, data mining could assist with preparing meeting agendas, writing meeting minutes or contributing updates to work plans or compiling statistics.

> Example: Queries can provide statistics of a document such as 'Total number of variants required to build the document', 'Duration of the Drafting activity, 'List of the main contributors', 'Number of all approved/rejected contributions per meeting' etc.

Furthermore, each document has a set of properties, such as the information about the author, a related comment, the reason for change or relevant EC mandates etc. All this can be used for advanced searches.

> Example: A public authority may be interested to download a package of all those standards which operate in a certain frequency range or which apply for a technology cluster (e.g. Smart Cities), whereas an implementer might be more interested to export the relevant requirements of a technology.

Publishing

Various output formats for publication can be generated such as HTML5, XML or PDF. For ETSI users will start a new document with preformatted skeletons, later to be rendered in the appropriate format for the different ETSI Deliverables. The creation of customized rendering templates will also be possible.

> Example: Another added value use case is to generate a redline version for each published ETSI Deliverable. The redline version can be made available together with the published ETSI Deliverable and it indicates the changes made between the current version and its previous version.

Accessibility

Accessibility enables everyone to read, hear, and interact with tools and content. As a leading SDO it is incumbent on ETSI to enable accessibility in an integrated manner and not simply as an add on. The NWM toolset will do this and will support key accessibility features such as:

- Correct semantic structure
- Alternative text for figures
- Proper identification of language
- Resizable text
- Proper colour and contrast

While the level of the accessibility conformity of the NWM toolset is not yet decided, but it will implement the selected features according to ETSI EN 301 549 '*Accessibility requirements for ICT products and services*' [3].

NWM Tooling Needs to be Versatile

Customized Processes

To repeat, the goal of the NWM concept is to streamline the entire drafting process to the extent of enabling new working approaches. Thus, the NWM toolset will allow users to configure and set-up customized workflows (drafting processes) tailored to the needs of a particular community or situation – potentially even beyond the strict confines of standardization.

ETSI members' internal processes are not the same as, say, the internal working of an ETSI STF or a technical group which will need to adhere to the ETSI TWP [1].

Within any given group, different approaches (or drafting modes) will be needed for different situations, governed by parameters such as the type of document being drafted, who edits the document, who contributes, who approves the final output, which deadlines apply and the required levels of quality.

Indeed, even within the life-cycle of any particular deliverable the working mode may change, ranging from a reasonably free and creative mode early in the drafting process to a more rigorous mode, possibly under change control, as the document reaches a certain level of maturity.

Consequently, the NWM toolset facilitates a variety of *working modes* ranging from multiple-user input and editing without formal approval to strict change control-driven processes analogous to, say, the way 3GPP works. These modes can be given whatever names a specific context requires, for example *Change Control Mode*, *Implicit Approval Mode*, *Creative Mode* and *Open for Comments Mode*.

Different roles specify **who can perform actions** (responsibilities, permissions etc.) such as *Contributor*, *Approver*, *Integrator, Coordinator* etc. For example, in the ETSI WG context these roles would be performed by the Delegate, Chair, Rapporteur and STF Leader. Those working modes and roles could be customized to mean the following:

- In the *Change Control* mode only the *Approver* can record the decision of the group whether or not to accept a variant; only the *Integrator* (e.g., Rapporteur) can merge the variant.
- In the *Implicit Approval* mode an *Approver* is not required – the *Integrator* can record the decisions.
- In the *Creative* mode any group member can merge their variants without any control.
- The *Open for Comments* mode is used when a deliverable has been published (by ETSI) and anybody can make comments.

Furthermore, similar actions can be named differently according to each group's needs, such as *Approve* or *Agree*, again depending on a communities' convention.

Actions define **what can be done**. In the DISCUSS phase comments can be created and decisions can be taken such as to *accept*, *note* or *postpone* a document (variant). The ability to create comments is represented by the action *make a comment*. A decision could correspond to a WG Approval of a variant and is represented by the action *decide on a variant*. Likewise, in the INTEGRATE phase, variants can be merged and shared. The respective actions are, of course, *merge* and *share*.

An illustrative example is shown in the figure below.

	Modes			
Actions	Change Control	Implicit Approval	Creative	Open for Comments
Make a comment	Contributor	Contributor	Contributor	Contributor
Create a variant	Contributor	Contributor	Contributor	N/A
Decide on a variant	Approver	Integrator	N/A	N/A
Merge a variant	Integrator	Integrator	N/A	N/A
Share document for review	Coordinator	Coordinator	Coordinator	N/A
:	:	:	:	

Approval Actions
Approve
Not pursued
Defer

Approval Actions
Agree
Reject
Postpone

Figure 16: Examples of possible working modes

The Process Configuration Manager

The Process Configuration Manager (PCM) allows users to define **who** can do **what** and **when**, depending on the group, the type of document being drafted and its status (i.e., as described earlier in the NWM *context*).

By evolving through multiple contexts over time different variations of working processes can be accommodated. The elements of a context are:

- **Status**: the drafting state of the document with respect to its maturity, e.g., early draft;.
- **Group**: the set of people entitled to work on the document;
- **Working Mode**: The roles and actions that apply i.e., who can do what;
- **Actors**: who (within the group) performs which roles;
- **Time:** parameters such as deadlines, sync points and durations defining when the rules can be executed;
- **Quality:** parameters configuring the level of quality checks, Conflict Resolution or other quality considerations. Quality checks can be done on the EDR or on another rule set.

Finally, putting all of this together, Figure 17 shows an example of what a workflow could look like Note, this example is illustrative and does not intend to show a typical ETSI process, and for simplicity no time constraints are shown.

Drafting Phase	Early Drafting	Stable Drafting	Final Drafting	Preparation for Publication	Publicly available
Group					
Task Force	**Creative** CTX1 Contributor: STF Members Approver: not required Integrator: not required Coordinator: STF Leader Quality Level: Warnings	**Creative** CTX4 Contributor: STF Members Approver: not required Integrator: not required Coordinator: STF Leader Quality Level: Warnings			
WG	**Implicit Approval** CTX2 Contributor: ETSI Members Approver: not required Integrator: STF Leader Coordinator: STF Leader Quality Level: Warnings	**Change Control** CTX5 Contributor: ETSI Members Approver: WG Chair Integrator: Rapporteur Coordinator: Rapporteur Quality Level: Rigorous			
TB			**Change Control** CTX6 Contributor: ETSI Members Approver: TB Chair Integrator: Rapporteur Coordinator: Rapporteur Quality Level: Rigorous		
EditHelp	**Change Control** CTX3 Contributor: STF Members Approver: EditHelp Integrator: STF Leader Coordinator: EditHelp Quality Level: Rigorous			**Change Control** CTX7 Contributor: ETSI Members Approver: editHelp Integrator: Rapporteur Coordinator: Rapporteur Quality Level: Rigorous	
Publicly Available					CTX8 **Open For Comments**

Figure 17: Example of a possible PCM configuration for an ETSI deliverable

1. Let us imagine that at an ETSI Specialist Task Force works on an Early Draft of an ETSI TR. Every **STF membe**r can produce variants and merge these variants into the TR (context CTX1).
2. At this point the STF Leader decides to share the TR with the Working Group for an early review (context CTX2).
3. EditHelp performs a quality assessment (context CTX3) before the document can be considered a Stable Draft;
4. In the WG any **delegate** can provide comments and variants but only the **STF Leader** can merge the variants (if there is no objection). If no more comments are received the Task Force continues the work (context CTX4).
5. Once the **STF members as a whole** consider the document to be stable the **STF Leader** can share the draft to the WG (context CTX5) and Change Control mode applies. From this point on, the role of integrator is performed by the **Rapporteur**. The role of approver is now performed by the **WG Chair**.
6. In the Final Drafting phase (context CTX6) the approver role is performed by the **TB Chair**.
7. When the document is being prepared for publication (context CTX6). EditHelp performs a final quality assessment;
8. Once the document is published (context CTX8) users can make comments (and this might eventually trigger a revision of the document). Not shown for simplicity, but in practice this would require some form of maintenance team to handle the feedback.

PCM Modes for Third Parties

In principle, the PCM can be used to model any drafting process for any type of document. ETSI members could run an instance of the NWM toolset in their premises and define their own working modes to create for example technical documentation, a whitepaper or a contribution to be shared with a standardization group.

An example of a process to write a company-internal innovation paper is shown in Figure 18.

1. A staff member (the Author) drafts a document (context CTX1) …
2. … and shares it with the Team for review (context CTX2).
3. Once the document is estimated to be complete the Author shares it with the Unit for review (context CTX3) and eventual approval by the Unit Director.
4. After that, the Communication Team may be involved to create the graphics and to improve the general layout (context CTX4).
5. The document is then reviewed by the division (context CTX5) and approved by the Division Head for internal publication.

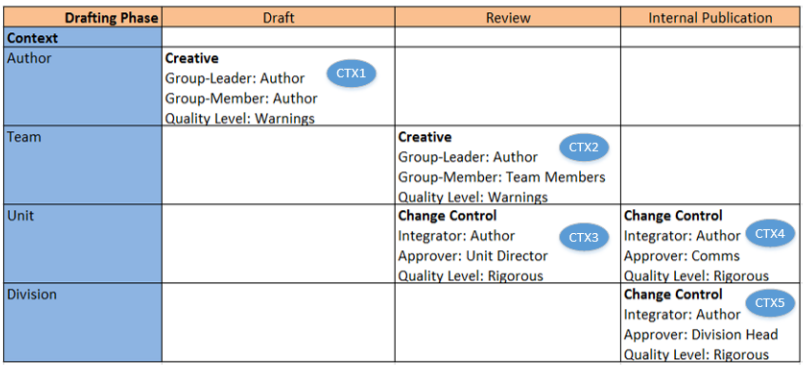

Figure 18: Examples of a possible PCM configuration at an ETSI member

A Few Words in Conclusion

Will the NWM concept and subsequent tooling deliver the stated aims?

Will processes and tools based on the NWM concept help us achieve the aims listed at the beginning of this paper? We believe so:

- Continuous drafting, slimmed-down processes, flexible drafting modes, easier on-line collaboration and the automatic merging of variants into a baseline will enable increased throughput by ETSI technical groups as well as ETSI support staff.
- The comprehensive monitoring and application of the EDRs will ensure the highest editorial and technical quality of our Deliverables.
- The NWM concept and tooling will facilitate closer integration with ETSI member working practices and make ETSI attractive to the next generation of standardizers who will be used to similar approaches in their daily life.
- Tagging and data mining will give ETSI Deliverables an added value for end-users, such as the extraction of requirements.

Why Not Take up an Existing Approach?

An extensive analysis of existing approaches was conducted at the start of the NWM project. Other SDOs have working methods deployed whereby they convert the output of working groups (i.e., standards) into structured content which is then provided via Linked Data Platforms. However, delegates cannot draft and collaborate in an integrated environment and benefit from structured content during the actual drafting process.

Commercial solutions exist, mainly built on Content Management Systems. Deploying these solutions would require a significant effort to adapt to ETSI's specific requirements. While those solutions do cover the drafting of documents they do not necessarily cover the management of contributions or vice versa. Another factor is the licensing cost (often based on per user or on per user action). In the case of ETSI where many thousands of users could potentially use such a system, payment models based on user licenses are not viable.

Some organizations have moved to drafting documents using existing OSS tooling (i.e., SCM platforms) and simple text editors (e.g., Markdown). Such approaches require the users to be familiar with code management principals; also, the existing OSS platforms do not provide the necessary PCM capability (i.e., as described earlier in the section NWM Tooling Needs to be Versatile).

Free cloud-based solutions exist. However, there are concerns that IT policies of ETSI Member companies may not allow access to such solutions, and anyway those solutions only partially cover ETSI's specific requirements.

Deployment Considerations

The deployment of the NWM concept and its associated toolset needs to take a transitional approach. The collective support of the ETSI membership during implementation and deployment is essential. Indeed, many ETSI members have already expressed their active support for the project and are considering to contribute resources to the work.

In 2018 we completed a field trial proving the basic concepts for ASN.1. A more ambitious second field trial involving text started in early 2019. The editing approach, and indeed the whole user

experience, will be towards simplicity, providing only the functionality needed. This should minimize adoption time.

The architecture of the NWM toolset based on the concepts described in this document includes well-defined interfaces to allow incremental extension (plugins) of the platform. Much of the implementation will be based on existing Open Source packages that are freely available. In that way the NWM platform can be built to our needs and we avoid getting locked into 'end of life' situations.

Consideration will be given to sharing the results of this work at a later stage.

Finally, we recognize that NWM is a cultural and technical challenge, leading to fundamental changes in the way we work. But we do have the will, resources and capacity to achieve our goals.

As stated above, NWM will not happen without the ETSI member buy-in and it will need successively to co-exist with current practices for a long time. After all, it took 13 years for the car to replace the horse in New York. It happened fast, but not overnight.

But it did happen. So too, we hope, will NWM.

Annex A: Abbreviations and References

Abbreviations

3GPP: 3rd Generation Partnership Project
CR: Change Request
CTI: (ETSI) Centre for testing and Interoperability
DPC: (ETSI) Document Processing Centre
EDR: ETSI Drafting Rules
EG: ETSI Guide
EN: European Standard
EOL: ETSI Online Account
EP: ETSI Project
EPP: ETSI Partnership Project
ES: ETSI Standard
GR: Group Report
GS: Group Specification
HS: Harmonised Standard
ISG: Industry Specification Group
NWM: New Working Methods
PCM: Process Configuration Manager
OS: Open Source
OSS: Open Source Software
SC: Special Committee
SCM: Source Code Management
SDO: Standards Development Organization
SMP: Standards Making Process
SR: Special Report
STF: Specialist Task Force
TB: Technical Body
TC: Technical Committee
TR: Technical Report
TS: Technical Specification
TWP: Technical Working Procedures
WG: Working Group
WI: Work Item

References

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[3] ETSI EN 301 549: Accessibility requirements for ICT products and services