

REVEALING HOW STANDARDS ARE DEVELOPED

Everyone approaches problem solving differently. Imagine the challenge of having to get multiple organizations to agree on a Standard that will be implemented globally. Yet, that's the reality of Standards development.

Standards are part of our everyday life. We may not always notice them, but they are there. Standards are the foundation for defining the compatibility and interworking of all the technology we use. As a contributor and editor in standardisation bodies like 3GPP, ETSI and ATIS, one2many is a driving force behind the development of standards.

But what is a Standard and how are they developed?

■ Let's start with a definition

The European Telecommunication Standards Institute (ETSI) states, in their 'Understanding ICT Standardization: Principles and Practice', that a simple and informal way to describe a Standard is "a widely agreed way of doing something."

ETSI also highlights that there are two main types of Standard: de facto and formal. Another name for a de facto Standard is a Standard in Actuality. A de facto Standard is when a solution is widely accepted and adopted by different industries with the product developed on such a basis being widely used by customers. The QWERTY keyboard from 1864 is a good example, or more recently, Blu-Ray discs for high definition content.

On the other hand, Standards Development Organizations (SDO) produce formal Standards. It's here that the 'widely agreed way' becomes paramount.

Formal Standards are developed and agreed on consensus. If one company objects, there is no agreement.

■ What are the main characteristics of a Standard?

The art of building consensus starts with the structure of a Standard. The audience for Standards is technical people. Experts in their field. Each Standard has explicitly stated objectives.

The body of the Standard must be clear and unambiguous, without being overly prescriptive. Standards only stress the essential requirements for compliance. They achieve this by distinguishing between mandatory elements and permissible alternatives, which take the form of simple guidelines. The Standards components must all be testable, if not actually, at least in principle.

■ What are the stages of development?

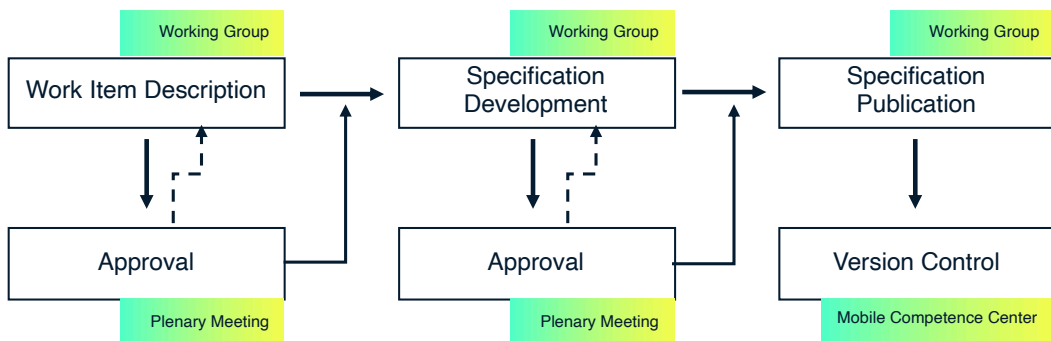
Each SDO establishes its internal organization and procedures for the lifecycle

management of Standards. Their procedures build consensus and ensure quality deliverables. As one2many is an active member here - let's take 3GPP as an example.

In 3GPP Standards are developed in stages.

- Stage-1 is where the service requirements are established: what service do we want?
- Stage-2, architecture, and service procedures are developed.
- Stage-3, protocols are developed that make the service possible across interfaces.

Each Stage is handled by an individual Working Group (WG), with 3GPP having separate WGs assigned to different technology fields. Although a separate WG focuses on a different Stage, the underlying process is the same across them all, as shown by the high-level diagram below. Work only progresses through the phases of each Stage once approved by the Plenary Meeting. Plenary Meetings are held four times a year.



High-level overview of the phases within every Stage

Not all new work has to start at Stage-1. If the Standard needs a service or protocol enhancement, then it's started in Stage-2. To start new work, the interested parties need to write a proposal for a Work Item Description (WID). This description contains the justification for the work, and objectives to be achieved, among other things. At least four companies need to support the WID before any further progress can take place.

The relevant Working Group discusses the WID. It often takes several iterations, but when there is no objection, the WID gets agreed within the WG. Before the Specification Development phase begins, be that for a Technical Report (TR) or Technical Specification (TS), the WID must be approved by the Plenary Meeting.

Each WID has an assigned rapporteur or editor in ATIS terminology. This person is

responsible for implementing the contributions from the WG's meetings. The rapporteur works with the other interested parties to finalize and agree on the content included in the TR or the TS.

For the subsequent phases: Specification Development and Specification Publication, there is a similar process. The WG discusses and drafts the Specification, when there is agreement within the WG the Specification is approved by the Plenary Meeting before it continues to the next phase.

■ Contribution is a must

All the work in 3GPP is contribution driven. Each interested party contributes to the writing of the Standard. Their contribution needs to be submitted at least one week before the WG meeting. During the meeting, each contribution is discussed, modified, and finally agreed.

Until the TR or TS is in a reasonable draft state, the WG itself approves the contributions. The rapporteur then includes the approved contributions into the TR or TS. Once the draft Standard is in a stable state, it is sent to the Plenary Meeting.

If the Plenary Meeting approves the Specification for publication, from then on, the TR or TS is under version control. All subsequent changes must go through a formal Change Request (CR) procedure. The Plenary Meeting approves all CRs before the Mobile Competence Center (MCC) can implement them. Interestingly, the people who work at the MCC are employees of ETSI.

■ Stages are developed in sequence

Here's an example of the sequence for the Public Warning System which one2many was actively involved in defining.

- **Stage 1** specification was developed in WG SA1: 3GPP TS 22.268, "Public Warning System Requirements"
- **Stage 2** specification was developed in WG CT1: 3GPP TS 23.041, "Cell Broadcast Service Specification"
- **Stage 3** specifications were developed in WG CT4:
 - 3GPP TS 25.419, "UTRAN Iu-BC Interface: Service Area Broadcast Protocol (SABP)" for 3G

- 3GPP TS 29.168, "Cell Broadcast Centre interfaces with the Evolved Packet Core" for 4G
- 3GPP TS 29.518, "5G System; Access and Mobility Management Services" for 5G

Each Stage happens in sequence. After all, you can't develop a procedure if you don't know what the process is supposed to do. In practice though, there is sometimes overlap towards the latter part of a phase; usually due to time restrictions.

■ Consensus means it takes time

Building consensus requires patience and compromise. After all, a working model based on consensus means that if one company objects to a Specification or a CR, then there is no agreement.

Modifying the text to remove the objection is comparable to a political discussion. Given that the Working Groups consist of different organizations, some of whom are competitors, the reasons to object are not always of a technical nature.

The positive outcome of consensus is that once there is an agreement, then you know the Standard will be adhered to globally.