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| 3GPP TR RS.zzz V0.0.1 (2020-06) | |
| Technical Report | |
| 3rd Generation Partnership Project;  3GPP IT Task Force (Ad Hoc Committee of the PCG);  A Feasibility Study on Virtual Presence in Physical Meetings  (Release 17) | |
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# Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

**shall** indicates a mandatory requirement to do something

**shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

**should** indicates a recommendation to do something

**should not** indicates a recommendation not to do something

**may** indicates permission to do something

**need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

**can** indicates that something is possible

**cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

**will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

**might not** indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

**is** (or any other verb in the indicative mood) indicates a statement of fact

**is not** (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

# Introduction

This work is motivated by the following action item from PCG 41:

**Action PCG41/01:** IT Improvements Ad Hoc Group to study the conditions under which virtual presence in physical meetings/virtual meetings would be practicable and the types of tools that would be required to support them [**3GPP/PCG#41(18)05**].

# 1 Scope

The present document discusses remote participation to a physical meeting. Possible use cases, requirements and solutions are considered. Recommendations are provided in the conclusion.

3GPP IT facilities can be used to achieve effective action in 3GPP meetings, yet this is only possible where the working procedures allow it. This report considers only what the 3GPP working procedures allow. Where there are any questions as to whether a particular function is allowed or whether it is even *desirable*, this discussion is left to the WP GROUP to consider and is out of scope of this study.

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

…

[x] <doctype> <#>[ ([up to and including]{yyyy[-mm]|V<a[.b[.c]]>}[onwards])]: "<Title>".

It is preferred that the reference to 21.905 be the first in the list.

# 3 Definitions of terms, symbols and abbreviations

This clause and its three subclauses are mandatory. The contents shall be shown as "void" if the TS/TR does not define any terms, symbols, or abbreviations.

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**physical meeting**: A physical meeting takes place face to face, scheduled in advance, in a location announced by an invitation and listed on the 3GPP calendar.

**virtual meeting**: A virtual meeting takes place entirely by means of communication technology, e.g. via e-mail or conference calls. A virtual meeting is also scheduled and listed on the 3GPP calendar.

**hybrid meeting**: A hybrid meeting includes participants who attend a physical meeting and other participants whose involvement occurs entirely by means of communication technology, e.g. via e-mail or conference calls.

**PA system**: A public address system includes microphones and speakers to provide sufficient audio amplification to enable physical meetings without straining either the speakers or the listeners.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

Symbol format (EW)

<symbol> <Explanation>

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

Abbreviation format (EW)

<ABBREVIATION> <Expansion>

# 4 Key Issues

## 4.1 General

This study will concern how to best support hybrid meeting. While there may be some improvements possible that will be generally useful, this is not the focus. In some sense, every delegate in a physical meeting could benefit from hybrid meeting support, if only to know what the status is in other parallel sessions of that same meeting, or concurrent 3GPP meetings occurring elsewhere. Where a particular consideration is general to all 3GPP meetings, this is called out in the report as a note.

## 4.2 Key issue #1: Potential roles in a hybrid meeting

This key issue investigates what roles in the hybrid meeting could be performed by a remote participant. The roles’ expectations and needs of these roles are elaborated.

## 4.3 Key issue #2: Activities performed in a hybrid meeting

This key issue considers which activities need to be carried out in a hybrid meeting. This will also identify the challenges associated with these activities. This key issue seeks to derive user goals (requirements) that need to be satisfied to enable remote participants to succeed in a hybrid meeting.

## 4.4 Key issue #3: Consolidating requirements, what IT support is needed?

Consolidating the requirements, what does this imply for IT support needs? Considering existing tools and solutions, what are the gaps between identified requirements and IT support available today?

# 5 Use Cases and Potential Requirements

## 5.1 General

In the assessment of requirements for different roles, the term <normal> implies that there should be no additional IT requirements to fulfil the needs of this activity. Since this may need further consideration, it is called out rather than omitting the discussion entirely.

Potential requirements in this section are referred to by number.

Consolidation of these potential requirements is done in clause 6. After clause 7 scenarios and 8 solutions, a gap analysis between consolidated requirements and the solutions and an evaluation of options is provided in clause 9. To ease this process, the following tags are used for IT capabilities:

[AUDIO] Involving the PA system of the physical meeting and audio input / output of remote participants.

[VIDEO] Screen sharing, video from webcams, video on-site of speakers, etc.

[FILE SERVER] File distribution without attachment to messages.

[EMAIL] Either email distribution or archiving, etc.

[MESSAGING] Instant messaging capability.

[DIVERSE] This category could be any of the above or some additional technology.

## 5.2 Roles in a Hybrid Meeting

The potential roles in a hybrid meeting are captured in the table below. The listed roles consider those participants who are *not present* at the face to face meeting. All other participants are considered to be at the physical meeting. The purpose of the table is to begin the discussion of the needs of remote participants to effectively take part in the meeting where others are present.

|  |  |
| --- | --- |
| **Role** | **Notes** |
|  |  |
|  |  |
|  |  |
|  |  |
| Active Remote Participant | An active remote participant has the floor, is able to take action – such as ask a question, make a comment, raise an objection, join a show of hands, volunteer to take on a role, etc. |
|  |  |
|  |  |
|  |  |
|  |  |
| Remote Voter | During a formal voting process, to resolve a technical vote, challenge to a working agreement or for an election, the remote voter can exercise their legitimate voting right. [NOTE 1] |
| Remote Attendee | A remote attendee not only participates in a hybrid meeting through electronic communication, but is also able to ‘check in’ – establishing their participation with respect to accumulating voting rights. [NOTE 2] |
| Notes:  [NOTE 1] The 3GPP Working Procedures determines when remote voting is allowed.  [NOTE 2] The 3GPP Working Procedures determines how voting rights are accrued and how these are applied to determine voting lists for 3GPP meetings. | |

Table 5.2: Hybrid Participant Roles

Due to extensive responsibilities to ensure that a meeting is productive and efficient, this study does not further investigate the role of remote chairman.

The questions of how to support a remote attendee mainly concern policy, not IT, so this role is not considered further in this study.

We assume to start out with that there are no added IT requirements for the face to face participants (chairman, secretary, presenter, active and passive participants, voters, attendees) as a result of enabling remote participants to join in a hybrid meeting.

NOTE: This assumption may turn out to be incorrect, e.g. we may decide that the F2F participants need some display showing ‘who is talking remotely’ or of the queue of remote participants waiting to speak, etc. We focus on the remote participants’ needs first.

## 5.3 Use Cases

### 5.3.1 General

These use cases are not formatted in detail as we know them well. If there is a need, these can be expanded into stories, etc.

As many of the potential requirements are shared between use cases, they are designated by letters, PR-A, PR-B, etc.

### 5.3.2 Remote Passive Participant

#### 5.3.2.1 Use Cases

The remote passive participant, unlike the remote active participant, follows the meeting without taking action. A remote passive participant that seeks to take action becomes a remote passive participant. As soon as a remote active participant is no longer active, the return to being a remote passive participant.

Most important to the remote passive participant is to see the screen, hear all active speakers (whether remote or physically present) and to have access to all information that would be available to participants who are physically present. The remote passive participant must be able to follow what is happening at the meeting, the status of documents and outcome of discussions.

The remote passive participant also listens to, watches and otherwise follows off-line drafting sessions or parallel sessions.

The remote passive participant sends periodic off-line queries, e.g. to find out what was not clear remotely, or to seek clarification on the current topic. Someone may take up these queries and answer off-line or even (if there is an established practice in the group) to ask the question on behalf of those who are remote.

#### 5.3.2.2 Potential Requirements

PR-00) **Essential: -** [DIVERSE] Participants in the meeting know who is in the queue, the order, etc.

PR-01) **Essential**:Gain the floor (this is how a passive participant can become an active participant)

- [DIVERSE] The remote participant can be recognised (by effectively raising a hand, etc.) by the chairman and given the floor. Remote active participants can be seen *at the same time* as those at the physical meeting by the chairman, so they can both be recognized and effectively form a single queue.

PR-02) **Essential**: [AUDIO] The remote participant can hear the audio of the PA system in the physical meeting, other remote participants, and especially the chairman, at all times. The physical meeting can hear the remote participant. See PR-08, which is related.

PR-03) **Essential**: [VIDEO] The remote participant can see what is on the shared screen.

PR-04) **Essential**: [FILE SERVER] Access to meeting file services.

- The remote participant has access to the file server for the meeting (inbox, docs, drafts, etc.) as well as timely information (the latest agenda, text of working agreements that will be challenged, etc.)

- Access for remote participants is ‘live’ (not substantially delayed compared to those attending the physical meeting.)

- The remote participant can upload files (to the drafts or inbox of the fileserver) at any time.

PR-05) **Nice to have:** [DIVERSE] The remote active participant is aware of the tdoc status, feedback via the shared screen or otherwise on-line of

- the status of the documents previously handled,

- the current document being handled

- future documents to be handled (in the foreseen order.)

PR-06) **Nice to have**: [VIDEO] The remote passive participant can see the face of the active speaker, whether remote or present at the physical meeting.

PR-07) **Nice to have:** [DIVERSE] The remote passive participant can ask a question or comment *without* getting the floor, in an informal manner, e.g. by sending an instant message. Somehow this question or comment will be perceived and potentially answered – depending on the resources available at the meeting and the working group’s policy.

Editor’s Note: Informal discussion facilities during the meeting, e.g by means of a CHAT facility, the use cases that they support, and the interaction by different roles in the meeting are FFS. In general, these activities in meetings are informal, though sometimes the chat session is used to flag errors or request numbers from the secretary.

### 5.3.3 Remote Active Participant

#### 5.3.3.1 Use Cases

The remote active participant is recognized and gets the floor to speak or take action. Every physical and remote participant in the meeting knows who has the floor.

The remote active participant can see the shared screen and hear what is said over the PA system and by remote participants (in case he or she is interrupted.) Especially, the voice of the chairman is always audible.

The remote participant knows which document is currently being presented as well as up to date information regarding the state of tdocs, the current plan to cover tdocs (the agenda order and document order in each agenda item) as well as the most recent version of the agenda.

The remote participant can **take actions** (e.g. request a change, object to any action proposed by the chairman or other meeting participants, propose a way forward, participate in a show of hands, etc.) The remote participant can also request clarification. The remote participant may also volunteer for actions (e.g. when the chairman asks for volunteers.)

The remote participant has access to the file server (drafts folder, inbox, docs folder, etc.)

The remote participant can join off-line discussions in the face to face meeting, including informal drafting sessions and parallel sessions of the meeting and see/be heard as any other participant.

#### 5.3.3.2 Potential Requirements

In addition to PR-00, PR-01, PR-02, PR-03, PR-04, PR-05, PR-07 above:

PR-08) **Essential**: [DIVERSE] The identity of the remote active participant is known to all meeting participants. See PR-02, which is related.

PR-09) **Essential**: [AUDIO] The remote active participant be heard from the audio of the PA system in the physical meeting, other remote participants. and especially the chairman, at all times. The remote speaker can be interrupted by the chairman at any time.

PR-10) **Essential**: [DIVERSE] The remote participant can take action (question, comment, object, participate in a show of hands, etc.) Importantly, the remote participant can raise an objection when asked by the chairman ‘are there any objections?’

PR-11) **Nice to have**: [VIDEO] Video of the remote active participant’s face (while he or she remains active), visible by other meeting participants (whether remote or physically present.)

### 5.3.4 Remote Presenter

#### 5.3.4.1 Use Cases

A remote presenter is able to present a contribution though not present at the physical meeting. Even though he is not able to see the chairman, the remote presenter must be able to be stopped by the chairman, to get instructions or be told to stop the presentation.

The remote presenter can see the screen that is presented to both physical and remote participants. Either the speaker or the chairman controls the screen (advancing the document, etc.) In drafting sessions, the remote presenter has control of the screen to make suggested changes.

The remote presenter hears questions and comments from physically present and other remote delegates, and can respond to them.

As much as possible, the experience of the meeting should be the same, irrespective of whether the speaker is physically present or remote.

#### 5.3.4.2 Potential Requirements

In addition to PR-00, PR-02, PR-03, PR-04, PR-05, PR-07, PR-08, PR-09, PR-10, PR-11, the following requirements apply:

PR-12) **Nice to have**: [VIDEO] The remote presenter can control the (shared) screen. (Without this capability, it is hard to imagine that a remote presenter can lead a drafting session or take part in off-line work as well as at the physical meeting.)

PR-13) **Nice to have**: [VIDEO] Video of chair and physical meeting participants when one presents

PR-14) **Nice to have**: [DIVERSE] remotely visible timer if presenters are time-limited

### 5.3.5 Remote ‘Session’ Chairman

#### 5.3.2.1 Use Cases

The remote session chairman has the ability to lead the session including both the remote and physically present participants.

As the principle of the hybrid meeting is to *add* support for remote participants *with minimal or no impact* to the physically present participants (and the way the physical meeting transpires), this is an ambitious use case that requires significant IT support. The remote session chairman has to be able to manage the queue of the physical meeting as well as the remote meeting. For this, the remote session chairman has to see the physical meeting – not just queues forming at microphones, but also hands raised (to take action in the meeting, e.g. to request the floor, to object, etc.)

#### 5.3.2.2 Potential Requirements

In addition to PR-00, PR-02, PR-04, PR-06, PR-07, PR-08, PR-09, PR-11, the following requirements apply:

PR-15) **Essential**: [AUDIO] The chairman can ‘take away the floor’ from the remote active participant (interrupting him or her, muting, etc.)

PR-16) **Essential:** [VIDEO] The chairman can see the physical meeting – all participants, so as to recognize raised hands, queues at the microphone, who is speaking.

PR-17) **Essential**: [AUDIO] The chairman always has the opportunity to take the floor, in the sense that he or she may speak at any time, otherwise as PR-09.

PR-18) **Essential**: [DIVERSE] The chairman can manage the queue.

PR-19) **Essential**: [VIDEO] The chairman controls the projection screen. Optionally the chairman may cede control of the project screen, as PR-12 (in which case the chairman needs to see the shared session as per PR-03).

PR-20) **Essential**: [DIVERSE] The chairman controls the tdoc status – of previously handled documents, of the current document handled and the order of the documents that will be handled subsequently.

NOTE: The chairman works with the secretary to capture all actions on tdocs in the meeting report. This is out of scope of this study.

PR-21) **Nice to have**: [VIDEO] A video of the chairman is available to all participants, when the chairman is speaking or taking action.

PR-22) **Essential**: [DIVERSE or VIDEO] The chairman is able to control (start, stop, etc.) a remotely visible timers (if presenters or speakers are time-limited.)

### 5.3.6 Remote Secretary

#### 5.3.5.1 Use Cases

With respect to this technical report, the remote secretary is either a remote passive participant, remote active participant or a remote presenter, with added responsibilities.

The secretary controls the CR, TDOC, etc. databases – issuing new numbers and changing the status of documents. They have access to the specification database as well. The secretary checks that documents that are presented are correct and compliant, especially when questions arise concerning their validity and compliance with procedures.

The secretary communicates changes to these databases to all participants both remote and physically present.

The secretary identifies who has the floor currently, hears what is said (from the chair and floor) and sees what is presented. This input is needed to be able to prepare the meeting report.

#### 5.3.6.2 Potential Requirements

In addition to PR-00, PR-01, PR-02, PR-03, PR-04, PR-05, PR-06, PR-07, PR-08, PR-09, PR-10, PR-11, PR-12, PR-13, the following requirements apply:

PR-23) **Nice to have**: The remote secretary has the ability to join all sessions: if there are parallel sessions, the secretary can switch between them (viewing and listening, possibly viewing both simultaneously.)

- [VIDEO] The remote secretary can see what is on the session screen *of the parallel session.* (similar to PR-03)

- [DIVERSE] The remote secretary can hear and identify the speaker *of the parallel session.* (similar to PR-02)

- [DIVERSE] The remote secretary can follow the tdoc status *of the parallel session*. (similar to PR-05)

PR-24) **Essential**: Capture all changes in the tdoc and CR databases and corresponding records in the report.

- [DIVERSE] Manage tdoc and CR database (numbers, assignments, etc) *remotely* so as to keep all participants in the meeting in sync

- [DIVERSE] In a physical meeting, it is possible to track tdoc assignments. Over a CC this is very difficult (for everyone, including a remote secretary.) There must be a remote representation of the current tdoc status for remote participants, including the remote secretary.

- [DIVERSE] Capture all agreements, actions and state changes on tdocs, and CR database in the report, including comments for the report, objections in the report. <normal>

PR-25) **Essential**: [FILE SERVER] The secretary must provide IT support to the meeting, though remote – at least maintaining the set of documents on the file server correct and up to date.

Editor’s Note: It may not be feasible to have a file server local to the physical meeting at all if the secretary is remote. In this case it may be necessary to run the entire meeting from the internet accessible file server.

PR-26) **Essential**: [DIVERSE] Interact with the Liaison officer throughout the meeting <normal>

### 5.3.7 Remote Voter

#### 5.3.7.1 Use Cases

The remote voter can identify the time and procedure for the formal vote (which is a ***confidential*** vote procedure) or show of hands (which is an ***open*** form of voting). He or she remains informed of any changes to the agenda, question asked, etc. before and throughout the meeting.

The remote voter can validate his or her voting rights and subsequently cast his or her vote according to the procedure.

The rules regarding remote voting are determined by the 3GPP Working Procedures.

#### 5.3.7.2 Requirements

PR-27) **Essential**: The remote voter has access to essential information providing voting instructions (question for challenge of a working agreement or text for a technical vote, timing, voting procedures, etc.)

- [DIVERSE] The remote voter can receive instructions from the chairman in a timely manner (e.g. via audio, visual, instant message, e-mail or other electronic communication that contain any relevant updates.)

- [DIVERSE] The remote voter can contact the secretary or chairman with any questions, to clarify the voting instructions, prior to the vote.

PR-28) **Essential**: [DIVERSE] MCC and group leadership can authorize the vote

PR-29) **Essential**: [DIVERSE] The remote voter can submit a valid vote, fulfilling the requirements of the working procedures and voting instructions for this particular vote.

PR-30) **Nice to have**: [DIVERSE] The remote voter can be informed of the outcome of the vote simultaneously with those meeting participants at the physical meeting.

### 5.3.8 Remote Attendee

A remote attendee is a registered delegate who is a 3GPP IM. A remote attendee can accrue voting rights.

This role does not officially exist, with the current 3GPP Working Procedures. This section is a placeholder to include a role and use case analysis if such a role is defined in future.

#### 5.3.8.1 Use Cases

#### 5.3.8.2 Requirements

# 6 Consolidated Requirements

Candidate Requirements for the Hybrid Scenario are derived in the following table.

|  |  |  |
| --- | --- | --- |
| **Consolidated Requirement** | **Essential, Nice to have** | **Potential Requirements** |
| 1 AUDIO | | |
| CR1.1 The speaker who has the floor + Chairman may **speak** and be heard both at the physical meeting via the PA system and by remote participants. | Essential | PR-02 |
| CR1.1a As above, but for *parallel sessions*. | Essential | PR-02 (nice to have) |
| CR1.2 The chairman shall have a **means to stop** a remote presenter or active participant from speaking. | Essential | PR-15 |
| CR1.3 The remote presenter **can be heard** over the PA system of the physical meeting and is audible to remote participants. (see CR1.1 which is the ‘input’ aspect of this requirement) | Essential | PR-02 |
| CR1.3a As above, but for *parallel sessions*. | Essential | PR-02, PR-23 (nice to have) |
| 2 VIDEO | | |
| CR2.1 **See** what is on the session screen remotely, including when it is being modified / marked up on-line. | Essential | PR-03 |
| CR2.1a **See** what is being presented in any parallel session | Nice to have | PR-03, PR-23 |
| CR2.2 A **remote presenter may control ‘the screen’ remotely**: the view will then be presented on the physical screen at the meeting and be available for view by remote participants. The chairman retains control over the screen in that he or she can ‘take it back’ from the remote presenter at any time. | Nice to have | PR-13 |
| CR2.3 Remote participants can **see the active speaker** in the physical meeting. | Nice to have | PR-06 |
| CR2.4 Participants in the physical meeting and remotely **can see the remote active participant** or **remote session chairman**. | Nice to have | PR-06, PR-07, PR-08, PR-21 |
| 3 FILE SERVER | | |
| CR3.1 Remote **access to the ftp server** for the meeting, with the same read and write characteristics as at the physical meeting. The content of the file server is not substantially delayed comparing the performance of the file server for remote and physically present delegates. | Essential | PR-04 |
| CR3.2 File server access is **managed by the secretary** (or **IT Support** [this role is FFS**]**, whether the secretary (or IT support) is physically present or remote. For example, erroneous files are removed, inbox files are periodically copied to the doc folder, delegates who have no other means to upload files can seek assistance from the secretary to have their files uploaded by the secretary, etc. [NOTE 1] | Essential | PR-05 |
| 4 DIVERSE | | |
| CR4.1 All (remote and physical participants) may **identify** **who** **is speaking** (active participant, secretary, session chairman, etc.), especially the active presenter (whether remote or physically present.) | Essential | PR-08 |
| CR4.1a The identity of the **current speaker is displayed (as text)** for all participants (remote and at the physical meeting). | Nice to have | PR-08 |
| CR4.2 The session chairman shall be able to **identify** active remote participants who have ‘**raised his or her hand**’ to become an active presenter (or to make a comment, to take an action such as in a show of hands, to object, etc.) All participants – remote, physically present, the session chairman, etc. know the order of the queue at all times. | Essential | PR-01, PR-16 |
| CR4.3 The session chairman shall be able to **give the floor** to a remote active participant, so he or she can become an active presenter (or just so they can make a comment via audio.) The chairman (whether the floor has been given or not) may always speak. | Essential | PR-17, PR-18 |
| CR4.4 Availability of the **tdoc status** for remote participants. This includes (a) the status of previously handled tdocs, (b) the outcome of the currently handled tdoc and next steps, (c) the order of tdocs yet to be handled. The ability to distributed agenda updates is included as part of this requirement. [NOTE 4] | Essential | PR-05, PR-20 |
| CR4.5 The session chairman has the ability to **manage the queue** of those who have ‘raised their hands’ to include both physically present and remote delegates. | Essential | PR-18 |
| CR4.6 Ability for all participants, remote or physically present, to **know the order and who is present in the queue**. The chairman **controls the queue.** | Essential | PR-00, PR-18 |
| CR4.7 Remote delegates are able to **take action** during the meeting. E.g. participate in a show of hands, raise an objection, seek to get the floor at any time, volunteer for an action – as to hold the pen to draft an LS, etc. [NOTE 2] | Essential | PR-10 |
| CR4.8 **Follow up action is possible** (by remote delegates, e.g. to participate in off-line revision) | Essential | PR-01, PR-10 |
| CR4.9 **Lead off-line revision** (involves control of the screen, but also some way to control the queue of speakers). [NOTE 3] | Nice to have | See clause 5.3.2.2 |
| CR4.10 **Remote and locally visible timer** to keep presentations time-limited. | Nice to have | PR-14, PR-20 |
| CR4.11 **Passive participation through messaging** – allows a participant to ask a question or make a comment that does not require the floor and may or may not be taken into account, depending on the group’s organization and practices. | Nice to have | PR-07 |
| CR4.11a there may be a way to **remotely ask a question or make a comment without having the floor**. This is already done informally via chat, email, etc. at meetings. | Nice To have. | PR-07 |
| CR4.12 Remote voters **receive voting instructions**. | Essential | PR-23 |
| CR4.13 MCC and group leaders can **authorize remote voters**. | Essential | PR-24 |
| CR4.14 Remote voters can **submit their votes**. | Essential | PR-25 |
| CR4.15 Remote voters can be **informed of the outcome** at the same time as voters at the physical meeting. | Nice to have | PR-26 |
| [NOTE 1] Even if the ‘remote secretary’ role is not supported, file server access may be challenging for remote participants, so this is a valid requirement.  [NOTE 2] Management of the queue remains the discretion of the chairman. The IT requirement does not imply any ‘automatic handling’ of remote delegates seeking to take action.  [NOTE 3] Leading off-line work is equivalent to the role of session chairman. All requirements apply.  [NOTE 4] While it is possible to inform everyone of tdoc status, agenda updates, off-line drafting session timing, etc. via the audio channel, this is not as good as by other means (e.g. distribution of a new agenda.) For this reason, different IT solutions will be evaluated (as adequate, excellent, etc.) | | |

Table 6-1: Consolidation of Requirements

# 7 Scenarios

This study distinguishes between two environments

- A **fixed location** which may be equipped with some IT support for remote participation, e.g. the ETSI premises

- A **hosted conference location** often in meeting facilities of hotels, etc. This location has infrastructure (audio, visual, network) that must be organized at the location in cooperation with the venue and host.

The resources available in a fixed location may be quite different than those in a hosted conference location. While the same roles need to be supported, it may not be the case that the goals are the same.

This study will identify recommendations that will meet the needs of the different roles primarily in the hosted conference location scenario. In a fixed location, more might be done than meet the requirements we identify for the hosted conference location.

Editor’s Note: FFS - Can we assume that the fixed location IT support will be at least as good, if not better than the hosted conference location?

Editor’s Note: FFS - Should this study seek to identify a single set of IT solutions that will always work? This would make remote participation easier, since you could obtain and learn how to use the remote participation tools… This is a question related to Scenarios because it could be that some fixed locations use different tools (already) than what this study would recommend for hosted conference locations.

# 8 Solutions

## 8.1 Solution 1: Chat Moderator for Notifications and Inbound Comments / Questions

### 8.1.1 Description:

A chat moderator in a session can provide outbound information via a chat tool, e.g. when a new AI starts, which tdoc is being handled, what the result was, any change to the prior arrangement (e.g. “We are done early with AI 15.3 so we are starting with AI 17.9 even though it is not yet 12:00.”)

This outbound information could include many details of the meeting – for example:

- Which tdoc is being handled currently

- The final status of each tdoc (e.g. “SP-201003 is revised to SP-201026. The revision will clean up the LS and address concerns over the second paragraph.”)

- Who the current speaker is (e.g. “John Dough of ABC Telecom is presenting SP-201022”)

- Announcements: “Coffee break will extend until 11:15. There will be drafting on agenda item 4.3 in the parallel room.”

- Current queue: “Queue: John Dough/ABC Telecom, Aruna/Signal Thing, Dimitri/Elbonia Interior Ministry”

The chat moderator can gather comments and questions from the chat session and give voice to them (or a combination of them) at the microphone. This could support remote participants who have limited ability to participate, e.g. no ability to become a ‘remote speaker.’

NOTE: this solution requires a volunteer who is a F2F participant at the meeting session.

### 8.1.2 Technical Realization:

(a) Skype

(b) IRC

(c) Jabber

(d) App-specific (integrated into WebEx, GotoMeeting, Skype, or web-based)

FFS: Details allowing evaluation

### 8.1.3 Addresses Requirements:

As notification:

CR4.1, CR4.1a Identify who is speaking

CR4.4 Remote representation of the current tdoc status

CR4.6 Who is in the queue

CR4.10 Remote and locally visible timer (“time expired”)

CR4.12 Receive information about voting.

CR4.15 Receive ‘live’ info of vote outcome

As a means to send information to the group or chairman from any participant:

CR4.2 Indicate to the chairman that a delegate has raised his or her hand

CR4.7 Indicate to the chairman that you take an action (object, raise hand in show of hands, volunteer, etc.)

CR4.11 Passive participation through messaging

## 8.2 Solution 2: Live Tdoc status indication

### 8.2.1 Description:

The current tdoc under discussion is known remotely. The preceding and next tdocs should also be displayed, as well as their current status (e.g. noted, revised to, postponed, not handled, etc.)

This in some sense provides the same input as *hearing* the tdoc status from the chairman in a session, *seeing* the status recorded on the chairman’s notes or ‘database view’ during a plenary session, and *retrieving* the updated information e.g. from a local web page reflecting the past, current and future tdoc sequence and its status.

### 8.2.2 Technical Realization:

(a) ‘live’ or ‘often’ updated web page with status information.

(b) chat transcript includes tdoc status updates (“1455 opened.” “1455 revised to 1732, open.” An up-to-date tdoc list / chairman’s notes should also be available for download via FTP for those who want to know which tdoc is coming next.

FFS: Details allowing evaluation

### 8.2.3 Addresses Requirements:

CR4.4 availability of tdoc status

## 8.3 Solution 3: Remote Screen and Shared Audio Support

8.3.1 Description:

The session screen is made available to remote participants, so they can view the same display panel as being used in the F2F session. Nice to have: a remote presenter may control the screen.

The session screen of *parallel sessions* is also available, including the screen for ‘schedule drafting sessions.’

NOTE: This is not something we support today – the presenter does not control the screen in a F2F meeting, and in normal circumstances – it is not possible for remote participants to see the projection screen.

### 8.3.2 Technical Realization:

(a) gotomeeting

(b) gotowebinar

(c) many other proprietary conference tools and open source conferencing tools (e.g. Jitsi)

Editor’s Note: Details allowing evaluation could be added to the technical realization, especially for other tools than GTM.

Editor’s Note: Gotomeeting is given the focus since this is a tool we have experience with in 3GPP and MCC has licenses. Many other conferencing tools are available such as WebEx ™, Zoom, BlueJeans, join.me etc,

### 8.3.3 Addresses Requirements:

CR1.1,1.1a, 1.3, 1.3a the speaker (who has the floor) and chairman can speak and be heard both locally and remotely

NOTE 1: This assumes that the PA system is ‘patched into’ a system running a web sharing application (for 1.1a and 1.3a – also in *parallel sessions*.)

CR1.2 the chairman has a means to stop a remote speaker / remote active participant (muting)

CR2.1, 2.1a see what is on the session screen remotely

NOTE 2: This assumes that the projection screen system is ‘patched into’ a system running a web sharing application (for 1.2a – also in *parallel sessions*.)

CR2.2 a remote presenter may control ‘the screen’ remotely

CR2.4 see the remote active participant or remote speaker

CR2.4 see the remote participant

CR4.1, 4.1a identify who is speaking

NOTE 3: This assumes that for speakers at the physical meeting will be identified by means of the chat facility (someone must enter the information who is present at the meetin.) Alternatively (though not satisfying 4.1a) – the speaker can be identified by introducing himself or herself via audio.

CR4.2 identify ‘raised hand’

NOTE 4: Through chat facility, raised hand ‘button’, etc.

NOTE 5: Conference tools alone do not support CR4.5 and CR4.6 – this is left to the chairman, etc. to perform manually.

CR4.3 The chairman can ‘give the floor’ (by means of audio)

CR4.4 availability of the tdoc status for remote participants  
CR4.12 receive voting instructions  
CR4.15 inform of the outcome of votes

NOTE 6: Through chat facility, e.g. by the secretary or chairman, or by showing a screen with updates.

CR4.9 lead off-line revision

NOTE 7: Assuming a remote screen sharing session can be used for off-line drafting.

CR4.10 remote and locally visible timer

NOTE 8: Assuming the chairman (or whoever shares his or her screen), runs a timer application

CR4.11 passive participation through messaging

NOTE 9: This could be enabled through an integrated chat session with a screen sharing service, however the chairman or other delegates would have to adopt practices to take some action based upon text messages.

## 8.4 Solution 4: Remote Participation Tool

### 8.4.1 Description:

A remote participant can take action in the meeting.

Raise a hand to ask the chairman to be given the floor

Object to an action (e.g. when the chairman asks if there are any objections)

Volunteer for some action

Participate in a show of hands

NOTE: for queue management, some tool that manages who raised their hand in what order might be nice.

There is a **fundamental challenge** for all on-line tools used for group meeting coordination at a hybrid meeting. The tools assume that all participants are on-line and using the same mechanisms. Thus, for those at the meeting either:

- Raising hands (physically) needs to be entered into the remote participation tool (manually). This is a process that could slow down the meeting progress, especially in larger groups, not necessarily be accurate.

- Everyone (whether local or remote) uses the electronic tool. This process could reduce the efficiency and experience of the face to face meeting. It would constitute a *change in the behaviour of physical meetings* which may not be welcome, and is undesirable.

NOTE: The above points include ‘evaluation’ considerations intentionally.

### 8.4.2 Technical Realization:

Tohru (tohru.raisingthefloor.org)

### 8.4.3 Addresses Requirements:

CR4.1 the remote presenter, remote active participant’s name can be displayed.

CR4.6 all participants know the order and who is present in the queue

NOTE: See challenges listed under 8.4.1. This applies to CR4.1 and 4.6.

CR4.2 the chairman identifies remote participants who raise their hand

CR4.5 the chairman has the ability to manage the queue

CR4.7 active remote participants participate in actions

## 8.5 Solution 5: Remote Access to meeting FTP server

### 8.5.1 Description:

Remote access to meeting information can be achieved using FTP, as long as the internet accessible file server is synchronized with the local file server sufficiently frequently.

While file server mirroring between the local ftp server (at the physical meeting) and the internet accessible ftp server is possible, it is in practice not done in real time. There are often several minutes delay between the two servers, leading to a substantially different ability to access information (e.g. newly uploaded documents) between meeting participants.

Evaluation Note: It is not acceptable for remote participants to lack timely access to documents currently under discussion.

### 8.5.2 Technical Realization:

(a) improved mirroring support for FTP, including ‘reverse mirroring’ where remote participants can upload to an internet accessible FTP server (e.g. at ETSI), and the file uploaded will be made available in the INBOX or DRAFTS folder of the meeting server.

Editor’s Note: It is FFS whether such improvements exist or could feasibly be implemented.

(b) use of only the internet accessible ftp server.

Evaluation note: While this could suffice for a small group, performance would suffer terribly for a large meeting.

### 8.5.3 Addresses Requirements:

CR3.1 remote FTP access to the same content as the local meeting in a timely way

CR3.2 remote FTP access is managed by the secretary

NOTE: A remote secretary may not be able to manage the *local* file server (for the physical meeting.)

## 8.6 Solution 6: Remote Voting Tool

### 8.6.1 Description:

Electronic means by which a remote voter can cast a vote. The policy by which the meeting occurs conforms to the 3GPP Working Procedures. Specific instructions including the actual ballot used is the discretion of the meeting chairman.

Remote voters must represent an individual member (IM) with a voting right at the meeting. The remote voter uses the tool to (a) be authorized, (b) to cast their vote, (c) to prevent the same voting right to be used again (during a particular round of a particular election.)

To the extent possible the remote voting tool aims to reproduce (at a minimum) the security, efficiency and procedures used to conduct a face to face vote.

Existing mechanism: IM delegates present to vote are checked against the voting list. If ‘authorized,’ the delegate is given a paper ballot to fill in secretly and this is deposited in a ballot box. The votes are subsequently counted and checked manually.

### 8.6.2 Technical Realization:

1) Email Ballot.

The Secretary checks that the email sender corresponds to an IM on the voting list. If so, the vote is counted. With trust to the secretary, secrecy is maintained, the legitimacy is checked, the vote is counted.

2) MCC ‘electronic voting tool’

Editor’s Note: a description of this tool is needed.

### 8.6.3 Addresses Requirements:

CR4.13 Authorize remote voters

CR4.14 Remote voters submit votes

# 9 Gap Analysis

## 9.1 Existing Support

Existing IT tools in physical meetings are listed below, since the goal is to reduce the qualitative and functional gap between physical meeting and remote meeting participants.

1) Projection Screen

The screen is under the control of the chairman. In exceptional situations, others control the screen (a session chairman during a drafting session, the secretary before the meeting and during the break, a presenter with an extensive document to introduce, etc.)

The screen is only visible to participants in the session location.

2) PA system

The chairman and secretary have a microphone. Others are available to delegates.

The PA system is only audible to participants in the session location.

3) Participants can see each other (who raises their hand, who is at the queue, the chairman’s facial expression, etc.)

4) Email, with archive

Email access may be delayed in some conditions. The email archive is not populated ‘in real time.’

5) Skype

This is an informal mechanism and is used by some delegates to ask clarifying questions, request support of the chairman or secretary, to coordinate between parallel sessions, etc. As not all delegates can or will use this tool, it is not used for formal actionsin the meeting.

6) FTP Server (at the physical meeting, at [ftp.3gpp.org](ftp://ftp.3gpp.org))

7) Web server (at the physical meeting)

The use of the meeting web server generally provides a different view to the ftp server and meeting information. In some working groups, it is used to provide further services and information, but this is at the discretion of the meeting leadership, secretary, etc.

8) Participants can physically meet during the meeting, at breaks, at their seats, in the hall, etc. informally and can be assigned time to meet face to face for drafting in session rooms, the halls, etc.

Some considerations where there may remain some differences between remote participation and physical participation.

- Who is in the meeting?

Attendance in a hybrid meeting is unclear. Those who are present can see who is in the room and read the list of those in any remote participation tool (e.g. GTM, skype, etc.) Those who are remote cannot see who is in the room. The meeting registration is not an adequate guide.

- Some IT support locally will be more responsive than remotely, e.g. to the file server.

- Reliance on e-mail may not be a possible replacement for face to face off-line discussion, as delivery is much slower than instant messages and audio.

- Use of instant message may not be sufficiently ‘archived’ and ‘reported’ to comply with EAR requirements.

- Many of the mechanisms satisfaction of requirements (see 9.2 below) rely upon formal communication through an instant message service. This has not been done before (in physical meetings), so could constitute a change to the way physical meetings are conducted and the need (or desire) to capture actions in text for remote participants may slow meetings down.

- Currently there are concerns about meetings being recorded or photographed. This becomes nearly impossible to enforce when remote participation is possible.

## 9.2 Solutions vs. Consolidated Requirements

The table below compares the solutions in clause 8 to the consolidated requirements in clause 6, indicating where there are gaps. Further analysis, including evaluation, comes later in this clause.

Essential rows are blue. Nice to have rows are yellow. Problematic rows have red text.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Consolidated Requirement** | **1/ moderated chat** | **2/ live tdoc, etc. status** | **3/ remote audio / video** | **4/ remote participation** | **5/ ftp server aspects** | **6/ remote voting** |
| CR1.1 speakers may be remote |  |  | ✓ |  |  |  |
| CR1.2 chairman can stop speaker |  |  | ✓ |  |  |  |
| CR1.3 speakers can be heard |  |  | ✓ |  |  |  |
| CR2.1 see screen remotely |  |  | ✓ |  |  |  |
| CR2.2 remote control screen |  |  | ✓ |  |  |  |
| CR2.3 see meeting speaker |  |  |  |  |  |  |
| CR2.4 see remote speaker |  |  | ✓ |  |  |  |
| CR3.1 access ftp |  |  |  |  | ✓ |  |
| CR3.2 manage ftp |  |  |  |  | ✓ |  |
| CR4.1 indentify who is speaking | ✓ |  | ✓ | ✓ |  |  |
| CR4.1a identify speaker as text | ✓ |  | ✓ | ✓ |  |  |
| CR4.2 chairman sees raised hand | ✓ |  | ✓ | ✓ |  |  |
| CR4.3 chairman gives the floor |  |  | ✓ |  |  |  |
| CR4.4 live tdoc status, agenda… | ✓ | ✓ | ✓ |  |  |  |
| CR4.5 chair manages queue |  |  | ✓[NOTE 1] | ✓ |  |  |
| CR4.6 all know the queue |  |  |  | ✓ |  |  |
| CR4.7 all may take action | ✓ |  | ✓ | ✓ |  |  |
| CR4.8 follow up action is possible |  |  | ✓[NOTE 2] |  |  |  |
| CR4.9 lead off-line revision |  |  | ✓[NOTE 2] |  |  |  |
| CR4.10 visible timer | ✓ |  | ✓ |  |  |  |
| CR4.11 passive participation | ✓ |  | ✓ |  |  |  |
| CR4.12 voting instructions | ✓ |  | ✓ |  |  |  |
| CR4.13 authorize remote voters |  |  |  |  |  | ✓ |
| CR4.14 submit remote vote |  |  |  |  |  | ✓ |
| CR4.15 live info of vote outcome | ✓ |  | ✓ |  |  |  |
| [NOTE 1] The chairman may manage the queue in an ad hoc fashion based upon indications of requests for the floor (e.g. via chat) and requests made in the physical meeting.  [NOTE 2] Considering off-line work, this is only possible by means of solution 3 if the shared presentation tool is available for use in off-line sessions. In addition, CR4.9 is only addressed if a remote meeting participant can *lead the meeting* – meaning, they have access to the screen, can manage the queue, etc. This is as close as this report comes to describing the role ‘remote chairman.’ | | | | | | |

## 9.3 Evaluation

### 9.3.1 General

Considerations (from discussion on the 3GPP\_IT mailing list):

1) It may be desirable to select a few attainable goals with potential great benefit and begin experimenting with them at meetings, even if it doesn’t support all goals of all roles. We may not need to satisfy all requirements (even essential ones) initially.

2) It would be advantageous to choose an integrated tool to simplify adoption and use. It may be the case that no single tool will support all requirements.

3) Some of the tools discussed would be helpful at the meeting as well as for remote participants as meetings are very busy, meeting rooms are large, etc.

4) Some tool support is easy as there are existing tools that already partially fulfil the requirements and in addition MCC has experience with these tools already.

5) It may not be feasible to support hybrid meetings with large numbers of participants and / or an extremely full agenda. It is anticipated that it will not be as efficient to make progress in a hybrid meeting set up as in a face to face meeting.

3GPP already has experience with hybrid meetings.

- PCG meetings #42 and #43 were hybrid meetings. Both were run through the use of Gotomeeting for screen sharing and audio access, patching the PA system into the secretary’s laptop. Experience was adequate to good, in that remote participation and remote presentation was possible. These meetings had a small number of participants and did not have a challenging agenda to complete.

- RAN5 #85 was a hybrid meeting. A small number of delegates (under 10) needed to participate remotely as they could not get visas in time to travel. Experience was good - remote participation and remote presentation was possible.

- SA4-ah-17927 (SA4 MCPTT ad hoc) on 10.03.16 occurred simultaneously with SA #71. With a tightly restricted agenda, this hybrid meeting allowed working group consensus to be produced during the plenary week (including remote participation and remote presentations.)

- SA4-ah-36947 (SA4 MBS SWG AH on 5GMS3) on 12-14.11.19 was a hybrid meeting. The PA system combined with the microphones at the local site proved troublesome, the audio quality was poor. This led SA4 leaders to become more interested in remote meetings (fully remote) than hybrid meetings. This indicates that a competent audio technician’s support is quite important to the success of hybrid meetings.

### 9.3.2 Evaluation of solutions vs. requirements, where are there gaps?

Essentially, the de facto solution for remote participation at this point is Gotomeeting, and the normally available IT resources: e-mail service, ftp service. Additional mechanisms available include use of MESSAGING (especially as part of gotomeeting) and use of Tohru. Given these tools, which of the requirements poorly served?

**Poorly served:**

- CR1.1, 1.3, 4.3, 4.7 There is a delay between when a remote participant or speaker is *given the floor* and when they can *effectively take action* by speaking. “Can you hear me?” “Get closer to your microphone.” Etc. is a waste of on-line time. To avoid this, an audio technician can queue presenters or check audio levels off-line. This service greatly improves the efficiency of meetings for some SDOs that support hybrid meetings (e.g. ITU.)

- CR1.3 There is some evidence, e.g. in SA4, that good audio quality for hybrid meetings is challenging and requires the support of a comptent audio technician.

- CR2.2 In some remote meetings, some delegates with relatively poor internet connections do not see the ‘live’ shared screen. There may be nothing that can be done to solve this problem.

- CR4.4, 4.11, 4.15 As there is no ‘official tool’ for MESSAGING, it will be difficult to integrate live information delivery to remote participants.

- CR4.13, 4.14 Remote voting by means of email or the MCC tool has not been developed – it is not clear that this will work efficiently or to the satisfaction of the groups that employ it.

**Gaps:**

- CR2.3 It is not possible to see the participants in the physical meeting while remote. To address this the meeting would have to have ‘Video production’: cameras, a crew to control them, adequate lighting, etc.

- CR3.2 It may not be possible for a remote secretary to manage the FTP server present at the physical meeting (amongst other IT aspects of the physical meeting.)

- CR4.6 Without a dedicated tool, like Tohru, management of the queue in a way that all participants know who is present in the queue is not feasible. Further, even with Tohru, or a similar tool, it will be difficult to integrate queues of waiting participants in the physical and remote meetings in a transparent manner that doesn’t require inordinate amounts of manual work to maintain.

- CR4.8 It is not clear how off-line work can effectively include remote participants.

**NOTE: This is a very significant gap!**

- CR4.9 It is not clear that it is possible or worth the effort to support remote participants leading off-line revision, etc.

- CR4.11 There are few established practices that allow participation in meetings without taking the floor. There are informal ways to do this, but it is not clear that this can be extended easily to e.g. object via MESSAGING, ask the secretary for a revision number, etc. in a consistent way (as part of the expectations of a normal meeting.)

## 9.3.3 Evaluation

FFS: Add of specific solutions

# 10 Recommendations

FFS: Add recommendations

Annex <X> (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 02.06.20 | - | - | - | - | - | Initial Draft | 0.0.1 |
|  |  |  |  |  |  |  |  |