

Draft new Technical Report ITU-T YSTR.UC-CNB

Use cases of Converged IMT 2020 and beyond networks, and broadcasting network technologies for developing countries

Summary

IMT-2020 and beyond networks supports diverse data extensive use cases, which increases load on existing IMT infrastructures in developing countries. Current reliance only on IMT-2020 and beyond for both types of services unicast and multicast/broadcast is inefficient for large-scale content delivery. Converging IMT-2020 and beyond networks with broadcasting network technologies enables efficient delivery of multicast/broadcast services. This approach offers:

- Wider coverage and improved reach in underserved areas.
- Increased resource efficiency by avoiding repeated unicast transmissions.
- Greater resilience through supplementary broadcast paths.
- Support for mass services such as emergency alerts, educational content, software updates, and large-scale media distribution.

For developing countries, such convergence directly may address the network constraints for enhanced inclusive connectivity. This technical report provides use cases for developing countries in the converged IMT 2020 and beyond networks and broadcasting network technologies.

Keywords

IMT-2020 and beyond, Multicast Broadcast services, Broadcasting technologies, Converged IMT 2020 and beyond networks

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Use cases of Converged IMT 2020 and beyond networks, and broadcasting network technologies for developing countries

1. Scope

This Technical Report aims to research the possible use cases for developing countries in converged networks i.e. IMT 2020 and beyond networks and broadcasting network technologies. The scope of this Technical Report includes: •

- Considerations for converged networks i.e. IMT2020 and beyond networks and broadcasting network technologies; and
Possible use cases for developing countries

2. References

The following ITU-T Recommendations and other references contain provisions, which, through reference in this text, constitute provisions of this Technical report. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Technical report are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Technical report does not give it, as a stand-alone document, the status of a Technical report.

3. Definitions

<Check in the ITU-T terms and definitions database at www.itu.int/go/terminology-database whether the term has already been defined in another Recommendation. It would be more consistent to refer to such a definition rather than to redefine the term>

3.1 Terms defined elsewhere

<Normally, terms defined elsewhere will simply refer to the defining document. In certain cases, it may be desirable to quote the definition to allow for a stand-alone document>

This Technical report uses the following terms defined elsewhere:

3.1.1 multicast [ITU-T X.603]: Data delivery scheme where the same data unit is transmitted from a single source to multiple destinations in a single invocation of service.

3.1.2 <Term 2> [Reference]: <optional quoted definition>.

3.2 Terms defined in this technical report

This Technical report defines the following terms:

3.2.1 broadcasting technologies:

Editor's note: To be included in future contributions

4. Abbreviations and acronyms

This Technical report uses the following abbreviations and acronyms:

<abbr><expansion>

Abbreviation/Acronym	Expansion
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ATSC	Advanced Television Systems Committee
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DVB Digital Video Broadcasting

5. Conventions

In this Technical Report, potential requirements which are derived from a given use case, are classified as follows:

- The keywords "it is of critical value" indicate a possible requirement which would be necessary to be fulfilled (e.g., by an implementation) and enabled to provide the benefits of the use case.
- The keywords "it is expected" indicate a possible requirement which would be important but not absolutely necessary to be fulfilled (e.g., by an implementation). Thus, this possible requirement would not need to be enabled to provide complete benefits of the use case.
- The keywords "it is of added value" indicate a possible requirement which would be optional to be fulfilled (e.g., by an implementation), without implying any sense of importance regarding its fulfilment. Thus, this possible requirement would not need to be enabled to provide complete benefits of the use case.

6. Overview

IMT-2020 and beyond networks are expected to support a wide variety of new use cases which will significantly increase the need for additional resources in mobile networks. The existing mobile networks mainly rely on unicast delivery to serve users, however, by combining unicast with multicast and broadcast delivery methods network resources can be used more efficiently. Converged networks including IMT 2020 and beyond networks and broadcasting technologies (such as ATSC, DVB, etc.) can utilize the advantages of broadcasting networks, such as large coverage areas, enhanced resource efficiency, and flexibility. Converged networks can enhance network resilience by enabling access to a supplementary network and improving network reach in areas where the broadcasting network exists in areas and the mobile network does not.

This becomes particularly important for the developing countries as the existing IMT networks are constrained. The convergence of the IMT 2020 and beyond networks with broadcasting technologies introduces a transformative model for delivering high-volume data services, serving critical bottlenecks in the existing IMT networks.

This technical report presents use cases for converged networks (IMT-2020 and beyond along with broadcasting technologies) with a particular focus on developing countries.

Description of converged network for IMT-2020 and beyond (with broadcasting technologies)
<TBD>

7. Overview of broadcasting network technologies

8. Use cases for converged IMT 2020 and beyond networks and broadcasting network technologies

This section provides the use cases of converged networks i.e. IMT 2020 and beyond networks and broadcasting network technologies:

Editor's note: Following is only the introduction of the use cases to give a glance of use case scenarios for developing countries.

8.1 Ubiquitous Connectivity

Broadcasting technologies are designed to cater to a large coverage area. The addition of broadcasting technologies and convergence of the network makes wireless broadcasting the most efficient method for enabling ubiquitous coverage.

8.2 Affordable access to multicast/broadcast services

Affordability of existing broadband connections still remains barrier to connectivity in developing countries. Broadcast technologies like ATSC, DVB designed for non-dense network topography in which a single transmitter can serve a large geographic area. Such non-dense network infrastructure already exists in many sparsely populated areas, further reducing Capital Expenditure (CAPEX) and Operational Expenditure (OPEX) necessary for providing services to these populations via these networks. Convergence of these broadcast technologies with the IMT 2020 and beyond can be a good solution to provide affordable access to unconnected people living in remote places. The reuse of mobile network infrastructure (core network, backhaul) for multicast/broadcast delivery using both accesses, can also contribute to providing a low-cost service to users.

8.3 Low energy deployments for multicast/broadcast connectivity

Convergence with broadcasting technology can be particularly useful for devices that operate in remote or resource-constrained environments, where power conservation is critical.

8.4 Direct-to-Mobile (D2M) broadcasting

D2M can be made possible using converged networks. It can offer delivery of live television, news, and entertainment content directly to mobile devices without relying on mobile data or internet connectivity. Especially useful for rural and remote regions where cellular connectivity is limited.

8.5 Remote Education

Pandemic has generated and highlighted the need for tele-education facility everywhere. Challenges in providing education in rural areas can be resolved by converged networks to some extent.

8.6 Agriculture support

Broadcast-based approach ensures that even farmers in remote or low-connectivity areas receive real-time, actionable insights without relying on mobile data or internet access.

8.7 Emergency Communication

In the public safety and critical infrastructure domain, the converged network can provide a resilient, high-reach broadcast path for regional alerts, emergency warnings, and system coordination through broadcasting technologies, where broadcasting technology based converged network can enable immediate push delivery to millions of receivers including digital signage, first responder devices, and connected vehicles without reliance on network registration or Subscriber Identity Module (SIM)-based provisioning.

8.8 Smart cities and industrial IoT

Applications of converged network (with broadcasting technologies) can be further extended to smart city and industrial Internet of Things (IoT) deployments.

8.9 Software Updates

In today's AI/ML-driven digital landscape, software updates have significant importance specially from the perspective of security, compatibility in accordance with evolving technologies and performance optimization. It is a data extensive use case which results in amplified load on mobile networks. Software updates using broadcast networks can be very relevant in environments like live music or sports events with a large audience.

9. Considerations of converged network for IMT-2020 and beyond with broadcasting technologies

<TBD>

Bibliography

Annexure-I

A.13 justification for proposed draft new Technical report on “Use cases of Converged IMT

Question:	5/13	Proposed new ITU-T Technical Report	Tashkent, 28 Oct – 6 Nov 2025
Reference and title:	Proposal to initiate a Technical report ITU-T YSTR.UC-CNB “Use cases of Converged IMT 2020 and beyond networks and broadcasting network for developing countries”		
Base text:	C-0577R1	Timing:	2027-Q2
Editor(s):	Rashmi Kamran, India rashmi@freestream.ai Shwetha Kiran, India shwethak@iitb.ac.in Amit Kumar Srivastava, India amit.srivastava33@gov.in Sujit Kumar, India sujit.kumar88@gov.in Abhay Shanker Verma, India as.verma@gov.in	Approval process:	Agreement
<p>Scope (defines the intent or object of the technical report and the aspects covered, thereby indicating the limits of its applicability):</p> <p>This Technical Report aims to research the possible use cases for developing countries in converged networks i.e. IMT 2020 and beyond networks and broadcasting network technologies. The scope of this Technical Report includes:</p> <ul style="list-style-type: none"> • Considerations for converged networks (i.e. IMT2020 and beyond networks and broadcasting network technologies); and • Possible use cases for developing countries 			
<p>Summary (provides a brief overview of the proposal):</p> <p>IMT-2020 and beyond networks supports diverse data extensive use cases, which increases load on existing IMT infrastructures in developing countries. Current reliance only on IMT-2020 and beyond for both types of services unicast and multicast/ broadcast is inefficient for large-scale content delivery. Converging IMT-2020 and beyond networks with broadcasting network technologies enables efficient delivery of multicast/broadcast services. This approach offers:</p> <ul style="list-style-type: none"> • Wider coverage and improved reach in underserved areas. • Increased resource efficiency by avoiding repeated unicast transmissions. • Greater resilience through supplementary broadcast paths. • Support for mass services such as emergency alerts, educational content, software updates, and large-scale media distribution. <p>For developing countries, such convergence may address network constraints for enhanced inclusive connectivity. This technical report provides use cases for developing countries in the Converged IMT 2020 and beyond networks and broadcasting network technologies</p>			
<p>Relations to ITU-T Recommendations or other documents (approved or under development):</p> <p>ITU-T Rec. F.744.4, ITU-T Y.2017, ITU-T JSTR.atssc-imatv</p>			
<p>Liaisons with other study groups or with other standards bodies:</p> <p>ITU-T SG17, ITU-T SG21, 3GPP SA1, IETF</p>			
<p>Supporting members that are committing to contributing actively to the work item:</p> <p>India (Republic of), CDOT (India), TRAI, Nigeria</p>			