MBMS
- Multimedia Multicast/Broadcast Services -

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IP Unicast versus IP Multicast

ERICSSON

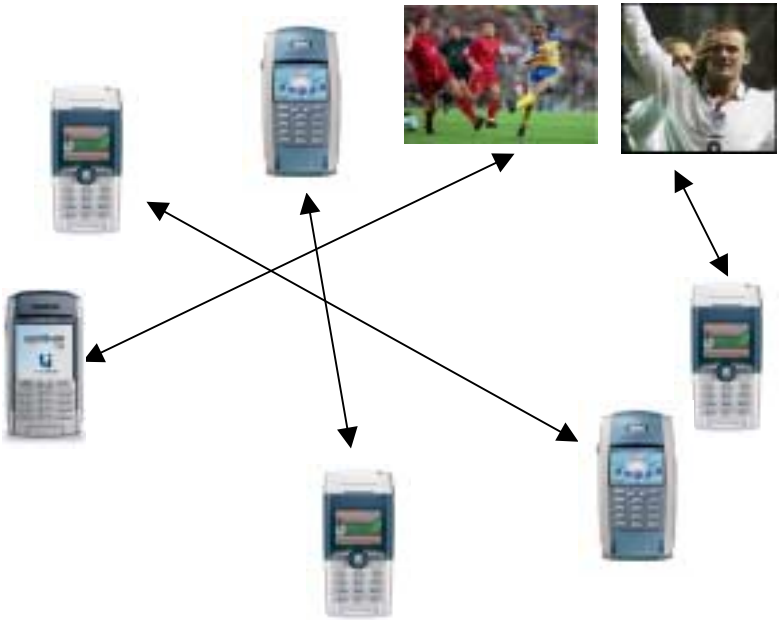
IP Unicast paradigm:

Communication between two single end-points

- Good for (asynchronous) person-to-person and client-server communication

- Used for on-demand content delivery today (e.g. streaming & download)

- Strength: Feedback channel for interaction



- Weakness: Bottleneck if same information should be delivered to many end-points at the same time

Broadcast paradigm

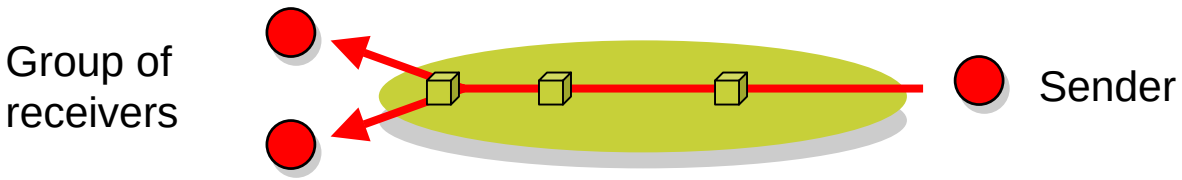
- One-to-many communication
- Strength: delivers same information to many users simultaneously
- Weakness: no feedback channel for interaction

IP Multicast paradigm:

Addressing groups instead of single hosts

- "IP Multicast is the efficient transmission of an IP datagram to a set of zero or more hosts identified by a single IP destination address." (Deering, 1989)

- Only one packet is send by the server to a group of receivers
  - Multicast Network (= IP overlay) cares about forwarding to registered hosts
  - Packets are replicated only when necessary



MBMS Overview

3GPP MBMS – The basic idea

- “Multimedia Broadcast and Multicast Services”
- Seamless integration of broadcast/multicast transmission capabilities into 3G service and network infrastructure
  - Serving large user groups simultaneously with content
  - New MBMS (radio) bearers
- Uses IP Multicast Framework for services
- Usage of MBMS bearer is transparent to the user

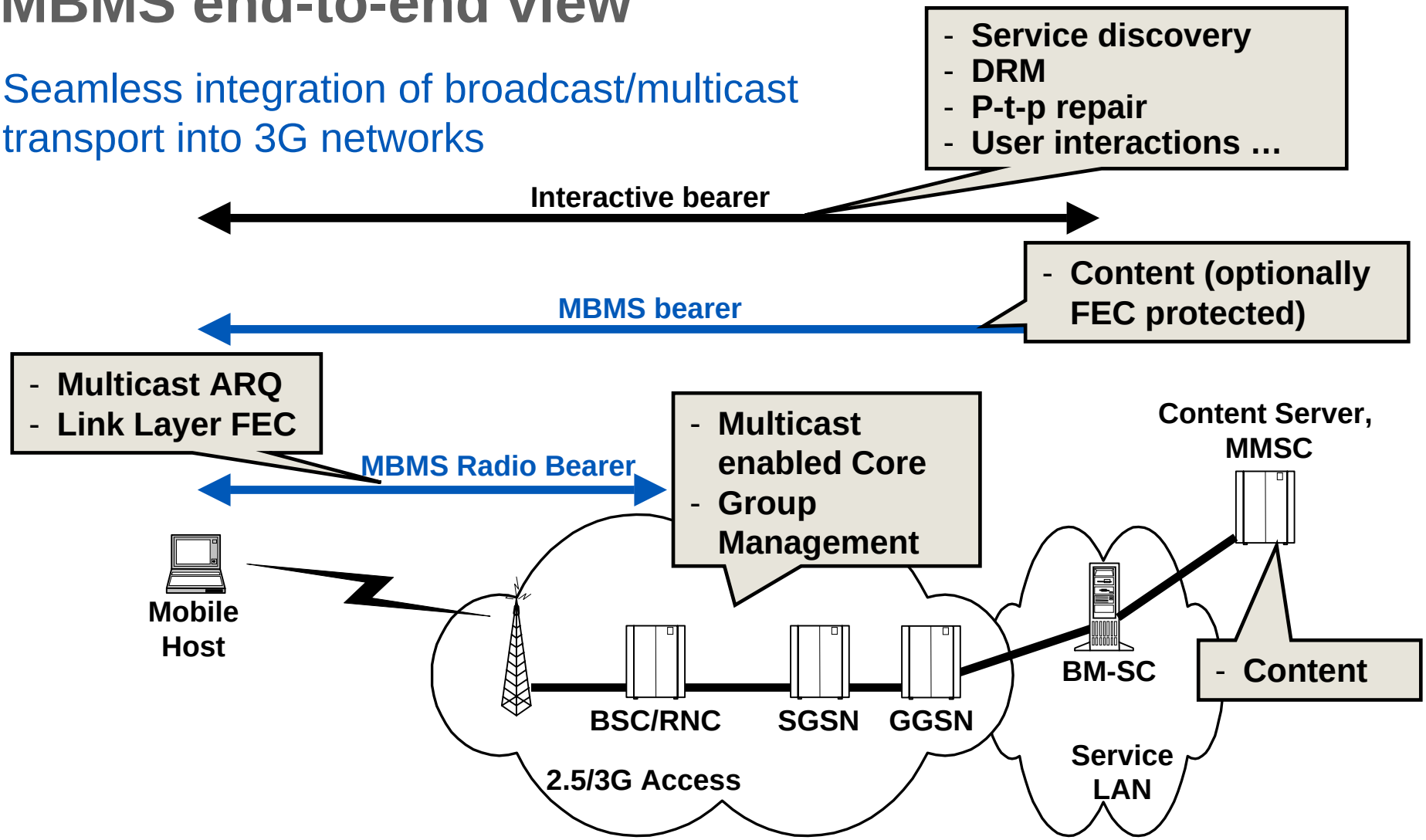
MBMS in 3GPP

- 3GPP Work Item for Release 6 (and Release 7)
  - Release 6 supposed to be frozen by September 2004
  - MBMS Stage 2 work (Architecture and Procedures) is almost finished
  - MBMS Stage 3 work (Protocols and Messages) has already started in some groups; It is expected that the stage 3 work for the Release 6 continues after the actual freeze date

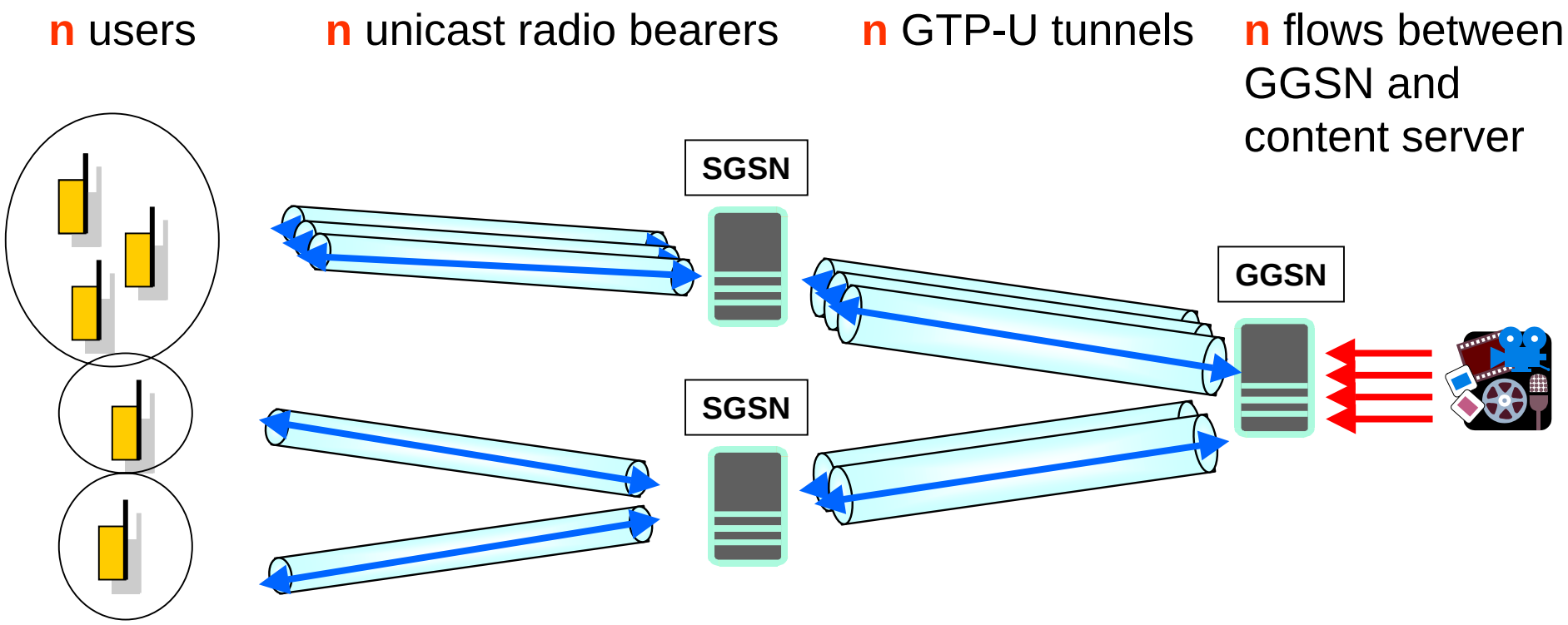
- 3GPP Overview:
  - Involved Groups: SA1-4; RAN1/2; GERAN2; CN1/3/4;
  - Driving companies: Three, T-Mobile, TIM, Vodafone, Ericsson, Siemens, Nokia, Nortel, Samsung, Qualcomm, NEC, Alcatel, Lucent, Panasonic, LG, …

MBMS end-to-end view

Seamless integration of broadcast/multicast transport into 3G networks

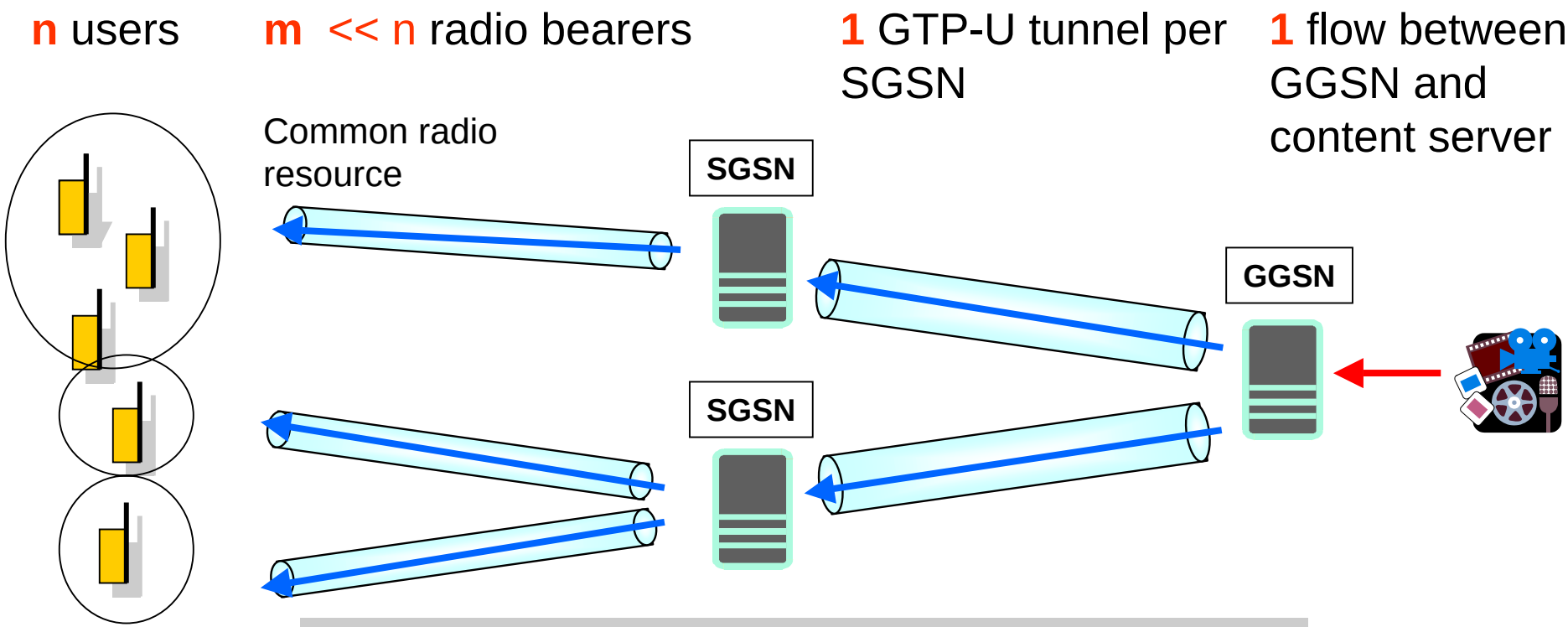


Content delivery via existing unicast bearers



Number of users **n** limited by available resources

Content delivery via MBMS bearer



- Considerable resource savings in CN and RAN!
- **Independent of number of users n!**

MBMS User Service

- MBMS Download (Messaging)
  - Push a multimedia message into the phone
- MBMS Streaming
  - Continuous media stream transmission and immediate played-out

Principles of Multicast Messaging/Download

- Users has joined to a certain Information Distribution services (“Push Service”)

- Two Phase delivery
  - 1st Phase: Information Message is “Pushed” into the Phone using MBMS delivery schemes
  - 2nd Phase: Post-Delivery Procedure like ptpRepair or Content Reception Reporting

Issues of Multicast Messaging/ Download

- New ptm protocol required for object encapsulation
  - SA4 bases work on FLUTE/ALC (IETF RMT protocols)
- Error free delivery of the object (content)
  - Content protection via application layer FEC

Principle of MBMS Streaming

- Different forms of content provision
  - “Live-Feed” from e.g. a Show
  - Scheduled transmission of pre-recorded content (e.g. news broadcast every day at 8am)
  - → User knows, when to connect to the server
  - → Different Announcements/Advertisements possible

- Basic Operation
  - User “hooks-on” and stays for a while
  - Content is received and immediately played-out on the display
  - Advanced feature: “Mobile VCR” to capture “Live” transmissions

MBMS Streaming

- Codecs not defined yet
- Video codec candidates:
  - H.264
  - H.263+
- Audio codec candidates:
  - AMR-WB+
  - Enhanced AAC+

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MBMS Streaming

- No feedback channel
- No power control

- Target for MBMS Streaming Bearer: BLER 1%

- FEC under discussion

3GPP MBMS – Summary

- Seamless integration of broadcast/multicast transmission capabilities into 3G service and network infrastructure
  - New function (“Broadcast/Multicast service center” BM-SC)
  - Extensions in Core- and Radio Network for new MBMS context
  - New multicast radio bearers

- Considerable resource savings in CN and RAN for multi-user content delivery services