



Service Continuity  
*Path to smooth user experiences*

Qualcomm Incorporated  
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Table of Contents

[1] Introduction ..... 2  
[2] Architecture ..... 3  
[3] Use case ..... 4  
[4] Conclusion ..... 6

### [1] Introduction

Qualcomm R&D continually aims to enhance the user experience over wireless systems. Service continuity is a technology concept that allows a user to transfer media content between the mobile (referred to as controller) and other devices such as TVs and laptops (referred to as controlee), while still retaining control of the service in the mobile device.

#### **Enhanced user experiences**

With service continuity, the user experience is enhanced by allowing the user to render media content on the best possible device(s) available at any given time, while allowing the user to retain control of the service using his or her mobile phone. The devices involved can be of any form factor, from net books to high definition television sets.

Service continuity operations can be performed among these devices as long as they have IP connectivity (either directly, or indirectly through a gateway) and can reach the service continuity server. Since the target device for media transfer (e.g. a controlee device like a TV), may have different hardware characteristics (display size, computing abilities, etc.) than the controller device (e.g. a Mobile phone), the target device(s) can re-negotiate the media parameters directly with the remote end after the transfer to ensure that the media is appropriately adapted for the best user experience. After the transfer, the media components flow directly from the remote end to the controlee without having to traverse through or be processed by the controller.

#### **A standardized feature**

As defined by the International Telecommunications Union (ITU), the Third Generation Partnership Project (3GPP) is responsible for setting the technical standards for 3<sup>rd</sup> (and future) generation wireless technologies based on GSM, including UMTS, HSDPA, HSUPA, HSPA+, and LTE.

Qualcomm R&D, along with other 3GPP participants, participated in the standardization of the service continuity concept in 3GPP Release 9.<sup>1</sup>

#### **Demonstrating the service continuity feature**

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<sup>1</sup> 3GPP TS 23.237 IP multimedia subsystem (IMS) service continuity is part of the 3GPP release 9.

The Qualcomm R&D team has also built a prototype to demonstrate service continuity on top of the generic Session Initiation Protocol (SIP) platform. The prototype consists of an application server, which implements the service continuity feature in the network, a controlee device such as a laptop or television, a remote end device and a wireless controller device.

The user can use the wireless controller device to control the multimedia session and move the media components within a multimedia session to one or more controlee device(s). The user can also use the controller device to perform a number of operations on the media components such as transferring them to one or more controlee(s), retrieving the transferred media back to the controller, or duplicating the media to one or more controlee devices.

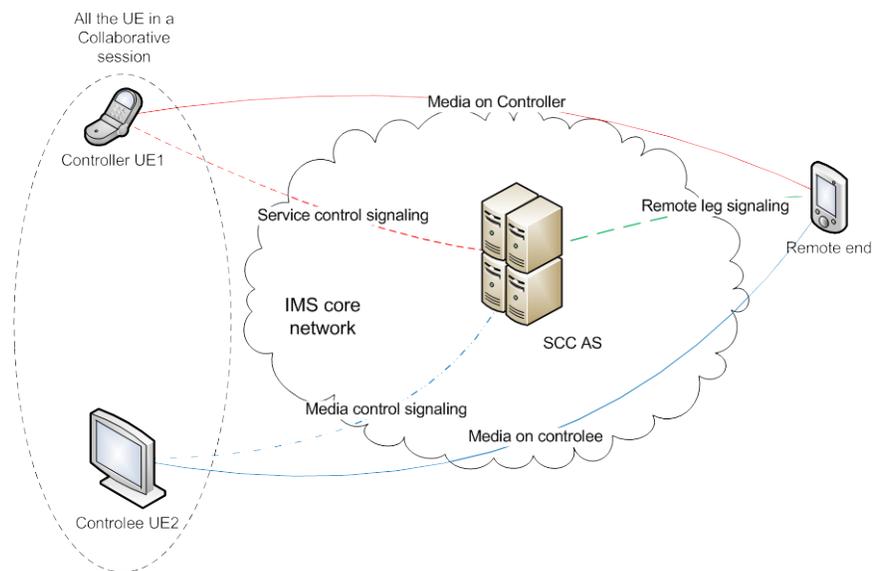
The controller retains full control of the service even after the session transfer. For example, if a user transfers an IPTV session from his mobile phone to an HDTV using service continuity, once the transfer is completed, he or she can still control the IPTV session from his mobile phone using commands such as pause, play, rewind and switch channels.

### [2] Architecture

The basic network architecture required to support service continuity in an IP-Multimedia Subsystem (IMS) network is shown in Figure 1.

Service continuity is offered as a home network service. It allows operations such as adding, deleting, and transferring of media flows belonging to an IMS session across multiple devices belonging to the same IMS subscription.

Service continuity requires a Service Centralization and Continuity (SCC) Application Server (AS) - as described in 3GPP TS 23.237 - that is connected to the IMS core network. The UEs also need to support SC capabilities to initiate service continuity operations.



**Figure 1 Service continuity Architecture**

### [3] Use case

This section gives a very basic example of how the service continuity feature can be used to augment the user experience.

In Figure 2, the basic use case set up is depicted. Both controller device (mobile phone) and the controlee device (HDTV) belong to the same user, Alice. The remote end device (Smartphone) belongs to Alice's friend, Bob. All Alice's devices are connected to the SIP core and service continuity server (SCC AS).

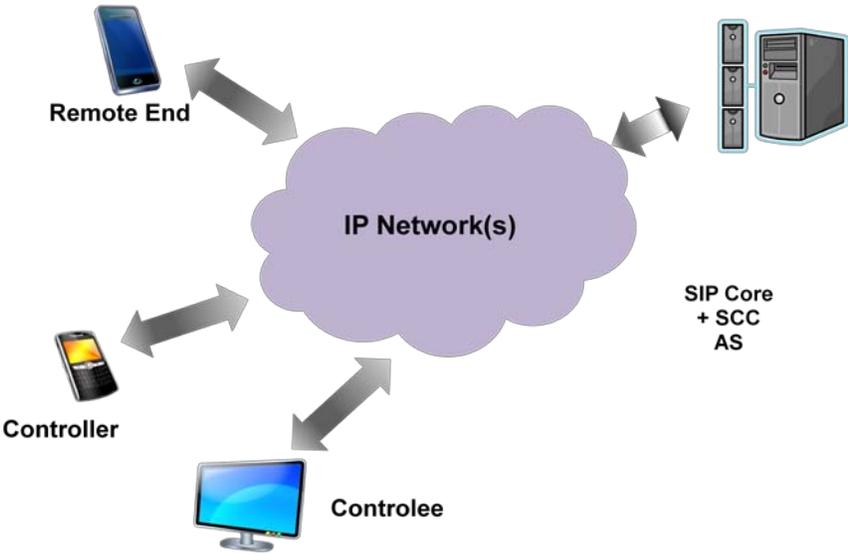


Figure 2: Service continuity - Basic setup

In Figure 3, the starting scenario is described. Alice uses the controller device (mobile phone) to communicate with her friend, Bob, who is using the remote end device. The communication session involves both voice and video media components. The multimedia session is established through the SCC application server.

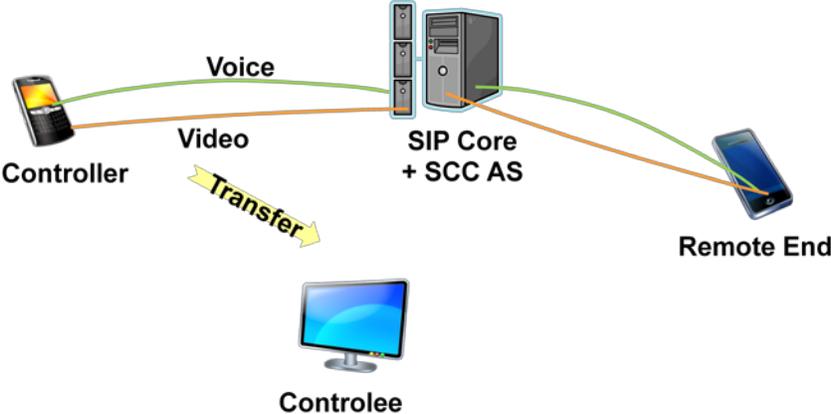
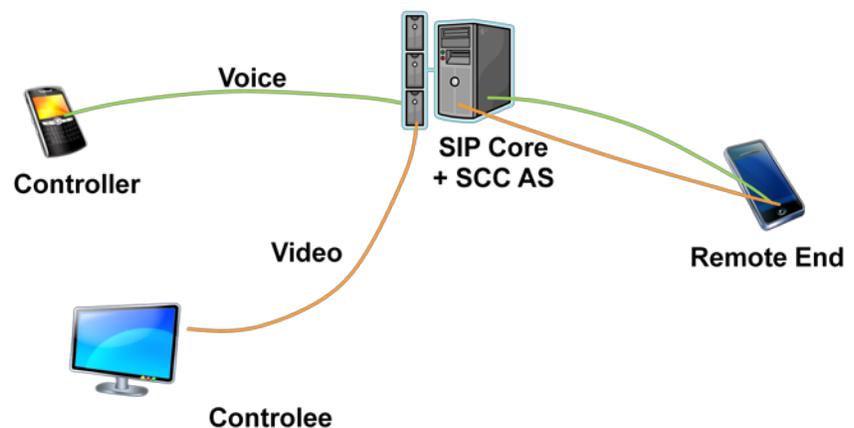


Figure 3: Service continuity - Before transfer

In Figure 4, Alice decides to move the video component to her TV. She interacts with the UI on the controller device and invokes the SCC AS to perform the service continuity transfer operation. The video component on Alice's side is now moved to the TV, which can potentially use a higher resolution display for video rendering. From Bob's point of view, he is still having multimedia session with Alice and is unaware that Alice is using different devices to render the different media components of the session. Figure 4 depicts the voice and video paths once the transfer has happened.



**Figure 4: Service continuity - After transfer**

Similar to the transfer operation described in this section, Alice can perform other operations such as:

- Duplication – The same media is replicated onto two or more devices
- Direct-add – A session with media flows on multiple devices is established before contacting the other end.
- Control-transfer – Session transfer involving the transfer of both media and control of the session to the target device.

### [4] Conclusion

Service continuity is a feature that enables enhanced multimedia session transfers. As the user is accustomed to more and more diverse devices in office, home, school and travel environments, there is a natural need to allow him or her to make use of the best available devices for each media component within a multimedia session. Service continuity

provides the flexibility to transfer multimedia sessions between all of these user devices.

The service continuity concept described in this white paper is simple and yet very powerful in paving the path toward a smoother user experience. It can be used for basic communication sessions and can also be extended to more advanced application or web sessions.