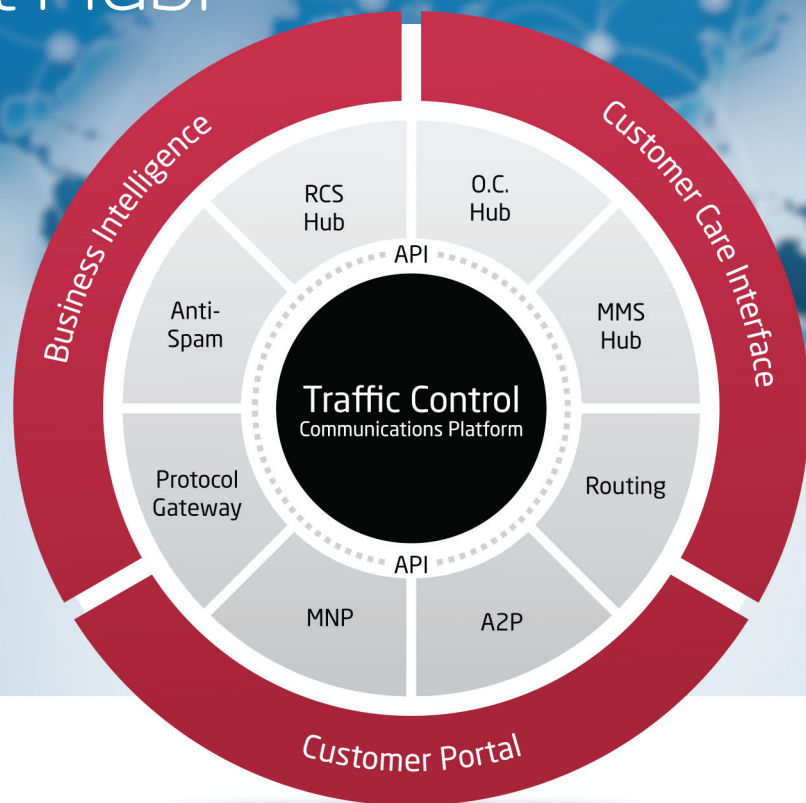


# RCS Interconnect Hub: Driving global interconnectivity of RCS



As telecom network messaging evolves to offer rich communications, there is a key requirement for interconnectivity. Much like with SMS, this will be a central factor to drive global adoption. Deployment of centralized hubs has been pivotal for SMS ubiquity.

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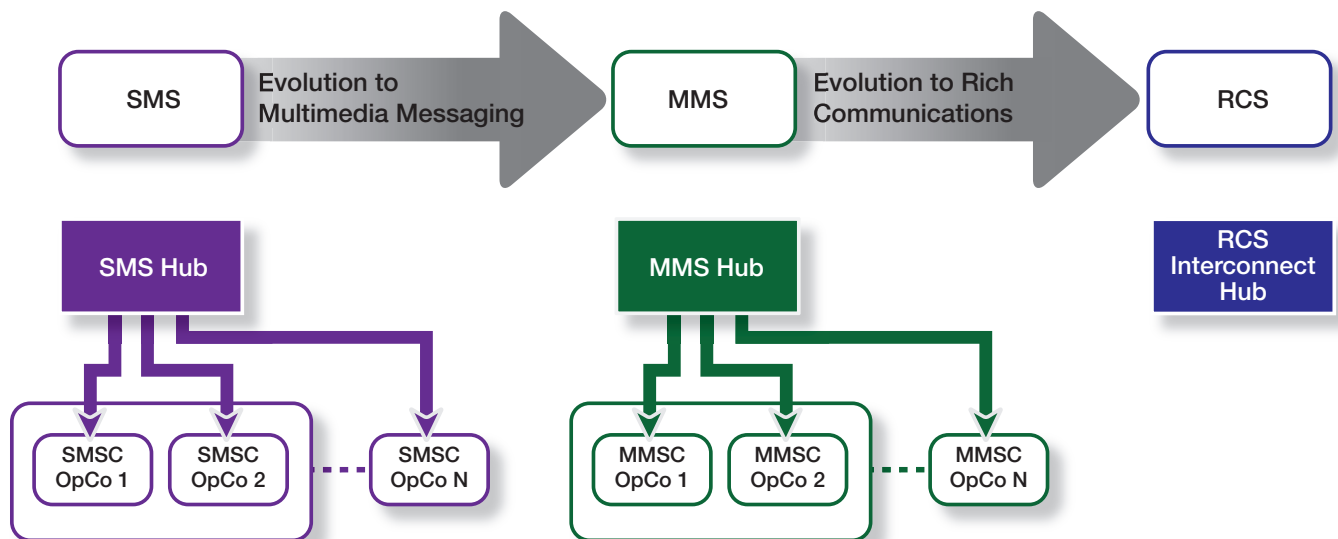
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# Introduction

Currently RCS launches have generally been country wide (e.g. Spain, Germany, South Korea, France) and interconnectivity has been agreed between individual Operators separately. However, much like the early stages of SMS, this is only a short-term solution and with 81 Operators committed to launch RCS by 2015 (source: GSMA), it is not scalable.

For example, each Network-Network Interface (NNI) needs to be agreed by each Operator, this will require 6400 interfaces to be correctly configured and managed. For a truly ubiquitous solution, RCS Interconnect Hubs, as proposed by the GSMA are essential.

For MMS, in addition to providing interconnectivity, Hubs have resolved incompatibility problems and stream-lined standardization issues. As RCS is rolled-out worldwide, providing a feature rich user experience such as Group Chat, Video Share and Social Presence, attributes such as interconnectivity and telco-grade reliability will be key differentiators. The evolution of telecom network messaging and hubs is illustrated below.



# Background for SMS and MMS Hubs

When SMS was originally deployed, each Operator needed to establish SMS interconnectivity with all other mobile Operators. This framework had huge drawbacks in terms of SMS transit between international Operators as agreements needed to be in place in all cases.

As the growth of Operators accelerated it became increasingly time consuming and costly to establish and manage all of the SMS interconnectivity agreements. The solution was provided in 2006 by the GSMA in the form of SMS Hubs. This mirrored the model used for international handling of voice.

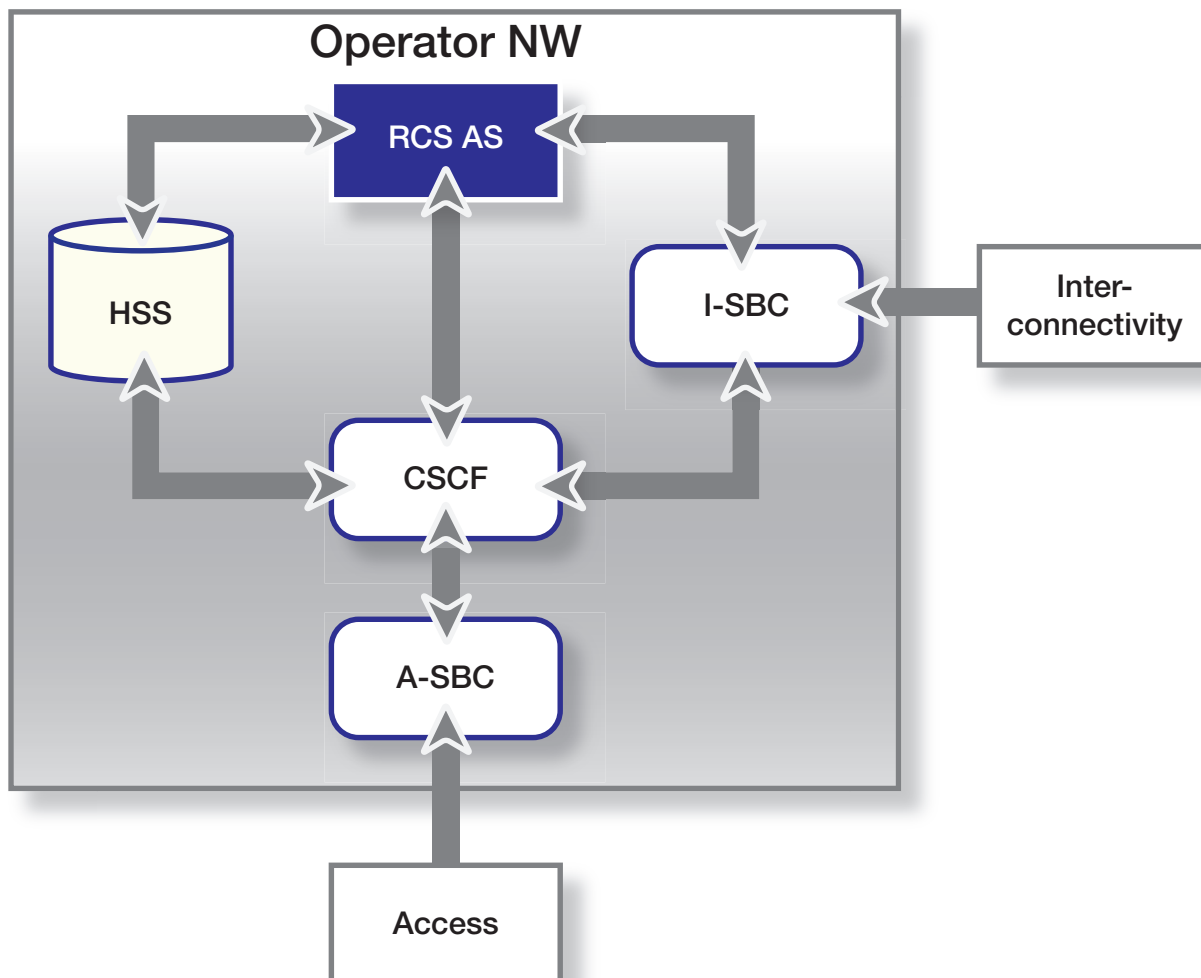
SMS Hubs offer a centralized location for SMSC interconnectivity, whereby agreements are managed by the hub providers. This is provided outside of the framework of existing roaming agreements between Operators. Effectively, SMS routing is provided as a managed service to Operators with transit fees and termination fees on a per SMS basis. SMS Hubs provide reduced complexity for Operators, whilst giving SMS a truly global reach. SMS Hub Least Cost Routing presents Operators with cheaper transport models and Store and Forward on the hub allows Operators to offload the responsibility for delivery to the hub provider. In many ways this is comparable to the handling of Instant Messages.

In a similar way, MMS Hubs are used by Operators to interconnect MMSCs. This has the added benefit of removing the many compatibility problems associated with this messaging technology. The MMS Hubs provide transcoding between Operators and facilitate the handling of large MMS between Operators. Different Operators will have different MMS size restrictions e.g. 100 KB, 300 KB or 600 KB and this is also factored in by the MMS Hub. This is analogous to handling inter-Operator File Transfers.

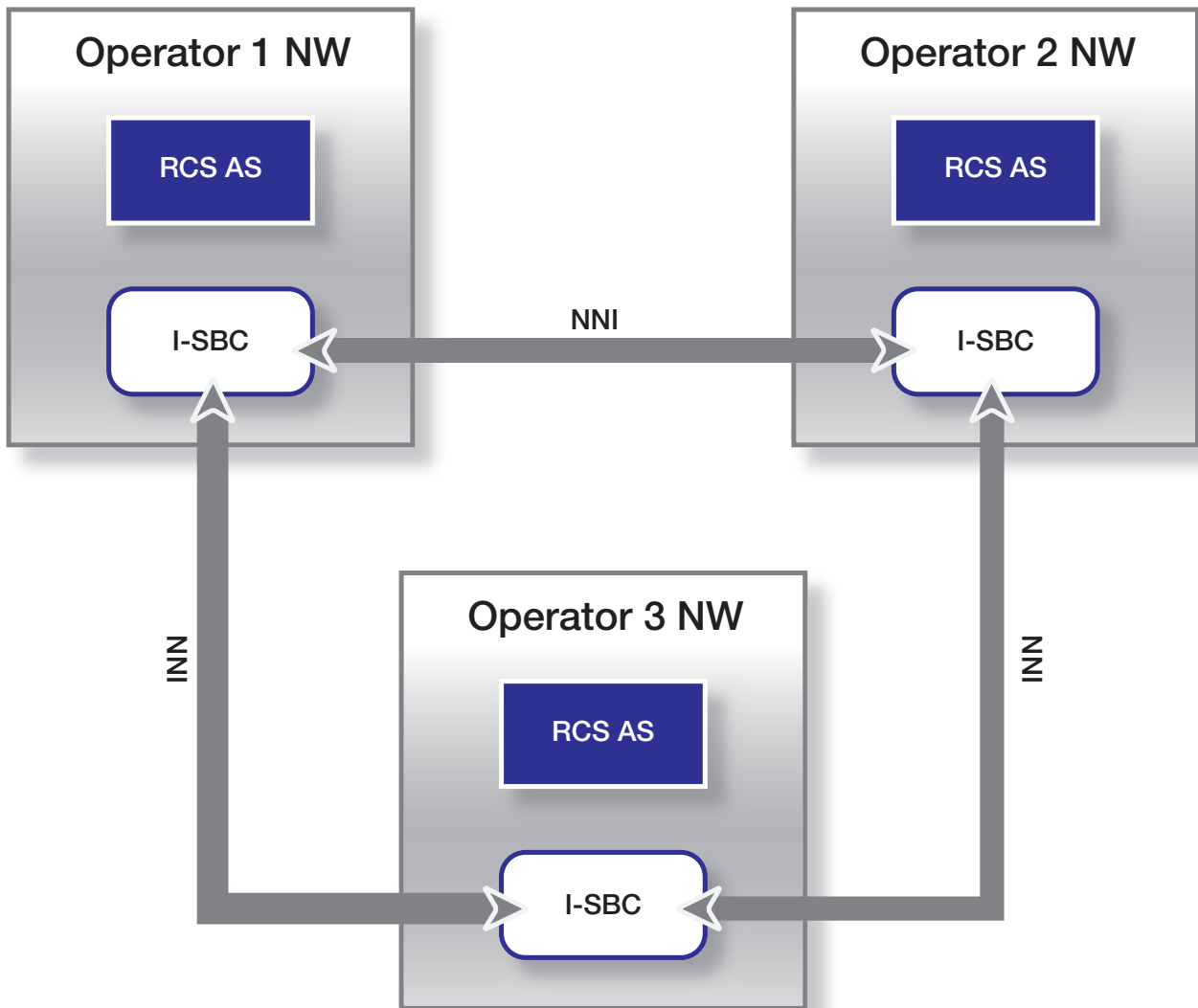
# RCS Interconnectivity

Currently there are diverse messaging solutions available, which have greatly enhanced user experience but are hugely lacking interconnectivity. The messaging ecosystem has become widely fragmented, with OTT messaging playing a significant role. The root cause of this fragmentation has been the lack of standardization.

RCS is fully standardized (GSMA) and built on IMS architecture, as shown in the below diagram. The RCS Application Server (AS), interfaces with the Call Session Control Function (CSCF) and the Home Subscriber Server (HSS). The interface to subscribers is controlled by the Access Session Border Controller (A-SBC) and interconnectivity to other RCS (IMS) networks is managed by the Interconnect Session Border Controller (I-SBC). The protocols used are SIP and Diameter.



The below diagram illustrates three RCS Operators interconnecting. As can be seen there are six integration points required, at the three I-SBCs of the respective IMS cores. The three RCS AS are all likely to be from different vendors, providing a separate interworking issue in itself.

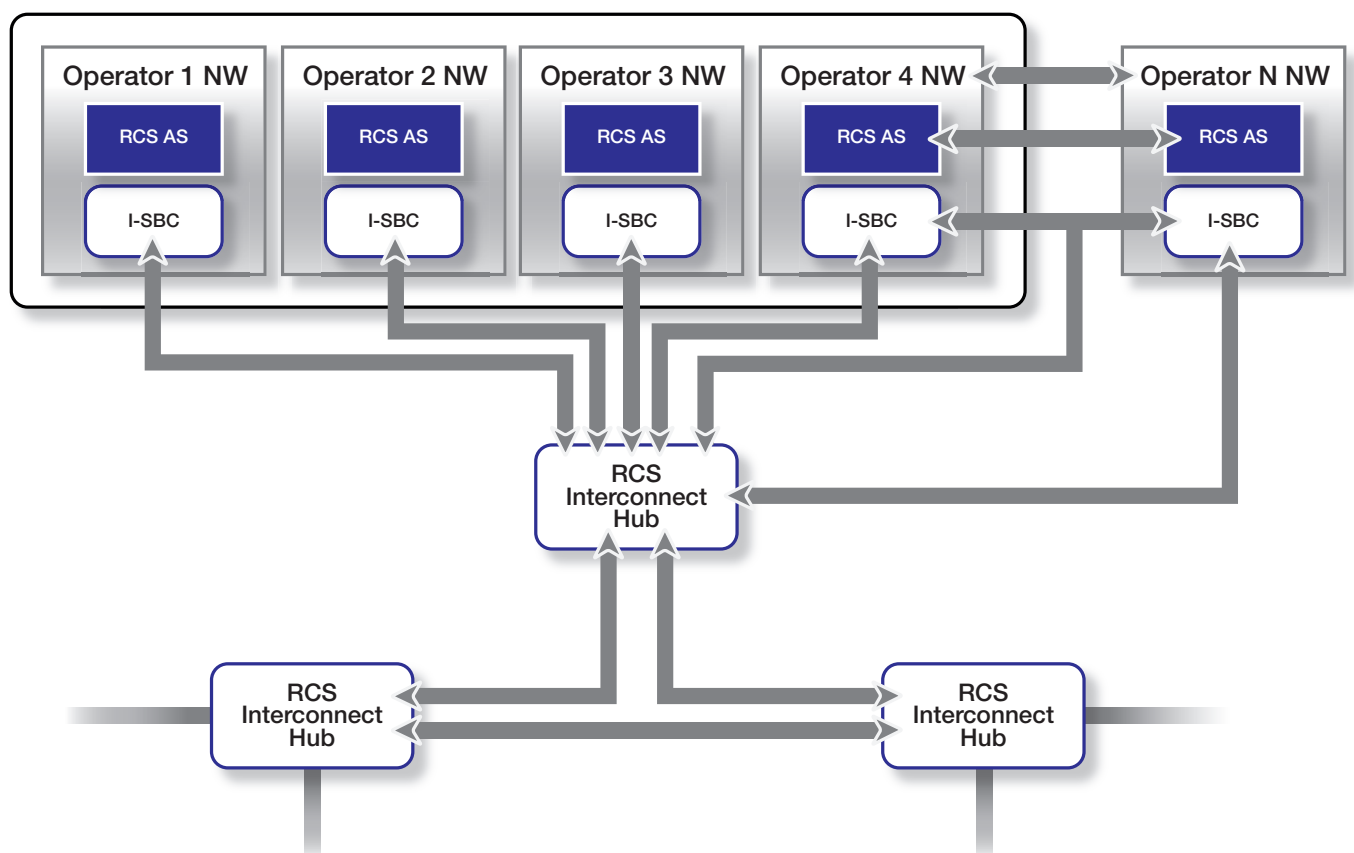


# RCS Interconnect Hub functionality

The RCS Interconnect Hub delivers the necessary functionality to allow full interconnectivity between Operators worldwide. This key component allows Inter-Carriers to interconnect Operators and allows Operators offer complete rich communications with telecom grade functionality and a global reach.

In a similar way to SMS today, the service is provided seamlessly and reliably. Operator to Operator agreements are centrally managed with transit and termination fees agreed. Effectively the RCS Interconnect Hub is providing IMS interconnectivity and as such will have future compatibility for IP-Messaging applications e.g. VoLTE messaging (IP-SM-GW).

Many similar interconnectivity problems facing RCS Interconnect Hubs have already been solved in the SMS and MMS Hub space. For example, the handling of Instant Messages can be directly mapped to the handling of SMS. Similarly, for File Transfers in RCS, many of the same techniques used in MMS Hubs are fully transferable.



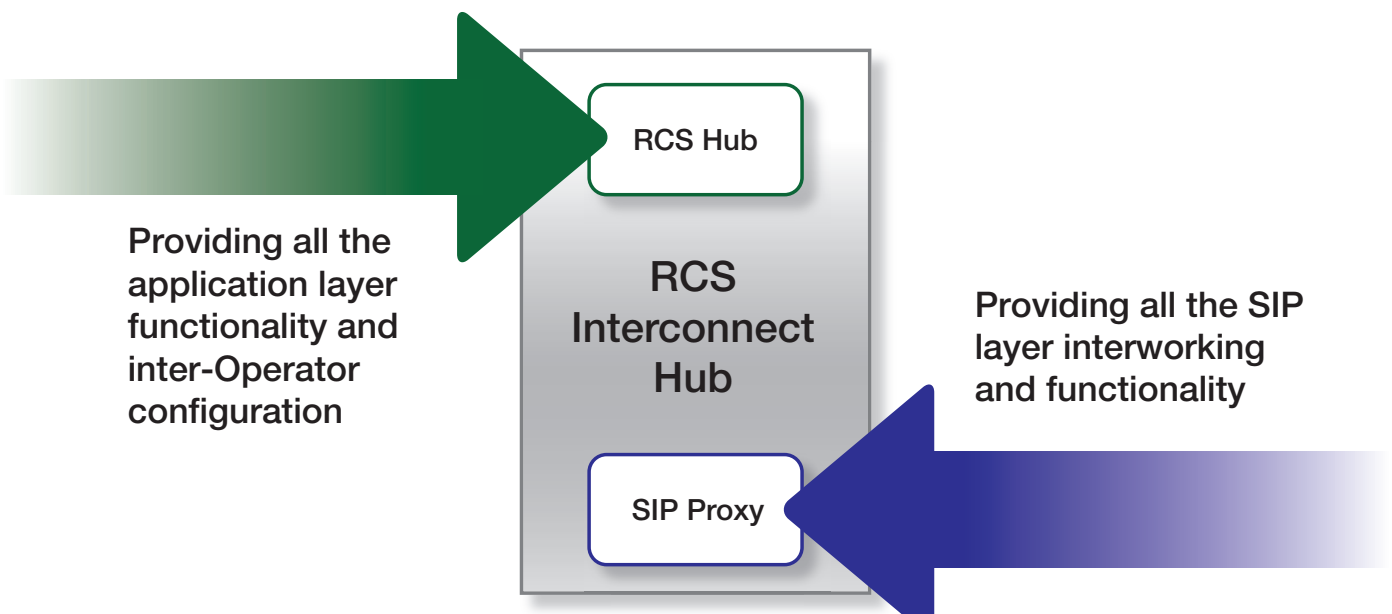
# Openmind's Hub Strategy

Building on our immense SMS and MMS Hub experience, we see a unique opportunity for both Operators and Inter-Carriers to embrace RCS and provide ubiquitous rich communications. The RCS Interconnect Hub is a central requirement to this and its functionality will be a key driver for RCS adoption. Interconnectivity has caused significant delays in RCS roll-outs, RCS Interconnect Hubs will seamlessly resolve most if not all of these issues.

The RCS Interconnect Hub will play an intrinsic role in bridging the Telco world with the internet based OTT communication providers. The RCS Interconnect Hub infrastructure will allow a global reach between all service providers. RCS Interconnect Hubs will also be vital for widespread exposure of APIs, both for RCS and for OTT communications. RCS interconnectivity will be standardized and GSMA compliant, but RCS and OTT interworking will enable differentiation.

## RCS Interconnect Hub Architecture

The RCS Interconnect Hub is shown in the below diagram. There are two distinct components; RCS Hub and SIP Proxy. The RCS Hub provides all of the application level functionality, such as interworking between different RCS implementations and enforcing Inter-Operator agreements. The complete list of features provided by the RCS Hub component is provided in the next section. The SIP Proxy provides SIP interworking between RCS Operators. This is a fundamental requirement of the RCS interconnect Hub to interwork with all possible variations in the SIP protocol.





# Openmind RCS Hub component key features

The Openmind RCS Hub component provides the following key features:

## Mobile Number Portability support

Crucial for international interworking, similar to the requirements with international SMS handling in SMS Hubs. Support for both modes of MNP and the capability to easily extend for specific customers MNP requirements, e.g. MAP, SMPP etc

## Filtering, permission setting and blocking between Operators

These settings can be directly mapped from existing SMS and MMS Hubs

## Support for interworking between different RCS implementations

There are variations in RCS implementations in terms of presence and file transfer handling e.g. between US and Germany

## Store and Forward capabilities

RCS Hubs take responsibility for future delivery to offline users

## Anti-spam protection

A key requirement for user experience, as already seen for SMS hubs

## Address translation support

Fundamental for global interworking and flexibility

## RCS Feature restrictions on an operator to operator level

As with SMS, inter-operator agreements will generally be conditional

## Content size restrictions on an operator to operator level

As with MMS, file size limitations form part of inter-operator agreements

## Multiple Hub interworking

For a truly global reach, multiple hops between hubs will be required

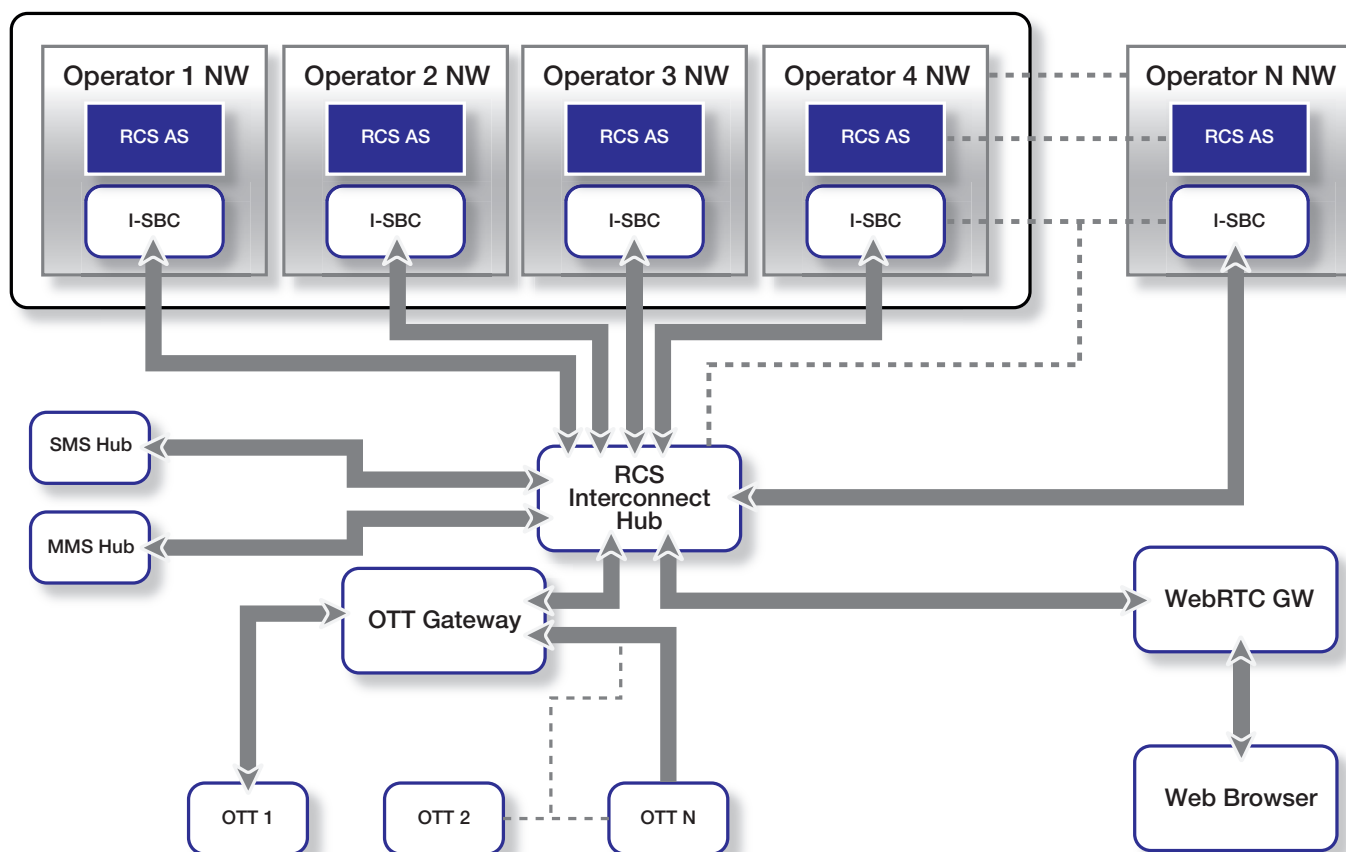
## RCS to SMS/MMS interworking

Interworking with non-RCS Operators provided by fallback to SMS/MMS

# Interoperability beyond RCS

The RCS Interconnect Hub is in a unique position not only to offer interconnectivity with other RCS providers but can extend this to interworking with OTT communication providers through interfaces centralized in the hub environment.

This will be a key step to addressing the fundamental issues surrounding the current fragmented communication ecosystem. With the deployment of OTT gateways, RCS APIs (GSMA OneAPI) can be centrally managed and reach multiple Operators. The OTT gateways will require OTT APIs in order to provide full bilateral interoperability. RCS Interconnect Hubs are also ideally placed to provide WebRTC gateways to extend the reach of RCS VoIP and Video to web browsers. Finally, the interfaces toward SMSC and MMSC Hubs provide interworking with SMS and MMS. This future topology is illustrated in the following diagram.



# Conclusion

RCS Interconnect Hubs are set to play a pivotal role in rich communications and the user experience they provide to consumers. Drawing on lessons learned from existing hub solutions will greatly expedite this.

RCS Interconnect Hubs are also uniquely positioned to resolve many of the fundamental drawbacks of the current fragmented communications ecosystem. They present a huge opportunity to shape the future of telecoms and firmly bridge the gap between the OTT based communication environment and telecom networks.

In addition to the standard Inter-Carrier revenue streams that RCS Interconnect Hubs provide, a wide variety of additional streams can be introduced through OTT and WebRTC gateways. Also, providing fallback to SMS/MMS and supporting VoLTE services.

## About Openmind

Openmind are market leaders in the SMS Hub space, providing our solution for all of the top ten Inter-Carriers worldwide. Openmind has strongly emerged as the fastest growing vendor in its market, with a single powerful mobile platform that offers multiple communication services to all market segments within the Telecoms industry.

Each day, over 1 Billion Messages are delivered on the platform. Customers include Inter-Carrier Operators, Mobile Network Operators, global leaders in Social Media and provide a range of Apps direct to consumers. An Open API is available to external developers, allowing them to create great Apps on a telco-grade powerful platform.

The success story continues with a recent announcement that the GSMA has successfully accredited its Hosted RCS module, 'Evolve', the first European vendor to accomplish this feat.

# Openmind and Hubbing

Openmind are world leaders in providing industry leading SMS and MMS International Hubbing products to Inter-Carrier operators throughout the world.

For 10 years Openmind has provided application-level solutions that build on the underlying transit and IP/SS7 connectivity provided by Inter-carrier operators and the network STPs.

In 2005/2006 Openmind worked closely alongside major Inter-carrier operators and the Open Connectivity forum from the GSM Association to define a set of standards for international SMS Hubbing culminating in the formation of the IR.75 SMS Hubbing standard.

Openmind have continued to drive Inter-carrier SMS/MMS messaging through their strong, committed, innovative, feature rich set of wholesale products. We believe that International messaging is only in its infancy as we merge towards a globalized messaging world.

A key to the success of Openminds SMS Hub has been the ability to marry both the SS7 and IP technologies in a protocol agnostic manner while at the same time providing a feature rich

suite of functionality configurable on a per operator/vendor basis. This flexibility is a crucial component to the successful delivery of SMS internationally. One important lesson we have learnt throughout our experience in international messaging is that nothing is ever the same. Each operator has their own intricacies be it technology driven, regulatory driven or simply preference driven and marrying these together in a seamless solution is paramount to the success of any technology internationally.

Openminds knowledge and experience in international SMS/MMS messaging is both admired and valued by our customers, some of whom are the biggest international SMS carriers in the world. We believe this knowledge and experience of international messaging can be leveraged towards the RCS messaging space to ensure RCS Interworking succeeds.

The success of SMS and to a lesser extent MMS is its global reach. The ability to send an SMS to anyone, anywhere in the world regardless of their location or home operator preference is one of the most important reasons for its success and longevity to date. We at Openmind are proud to be a part of this continued success and are committed to ensuring that RCS follows in a similar vein.