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OsmoBSC A / SCCPlite / 3GPP AoIP Options

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The Asciidoc source code of this manual can be found at http://git.osmocom.org/osmo-gsm-manuals/

HISTORY

NUMBER	DATE	DESCRIPTION	NAME
0.1	31 May 2017	Initial version of the proposal for internal discussion.	Harald Welte

Contents

1   Introduction

This document serves as a paper to illustrate the different configurations of OsmoBSC in terms of integration with BTSs and MSCs.

The document should accompany us in the 2017 development cycle which includes the *death of the NITB*, i.e. the move away from OsmoNITB to having OsmoBSC in all configurations, whether with a proprietary/external MSC or with OsmoMSC.

Particular attention is spent on the user plane, including aspects such as

• user plane transport address handling

• use of MGCP (Media Gateway Control Protocol)

• the (required) evolution of `osmo-bsc_mgcp`

• not loosing classic TDM (E1/T1) BTS support when moving from OsmoNITB to split OsmoBSC + OsmoMSC setup

2   Overview

2.1   Classic GSM RAN with E1 based Abis and E1 A

This configuration was actually never supported by OpenBSC, as E1 BTS support was so far for NITB only, but not for OsmoBSC.
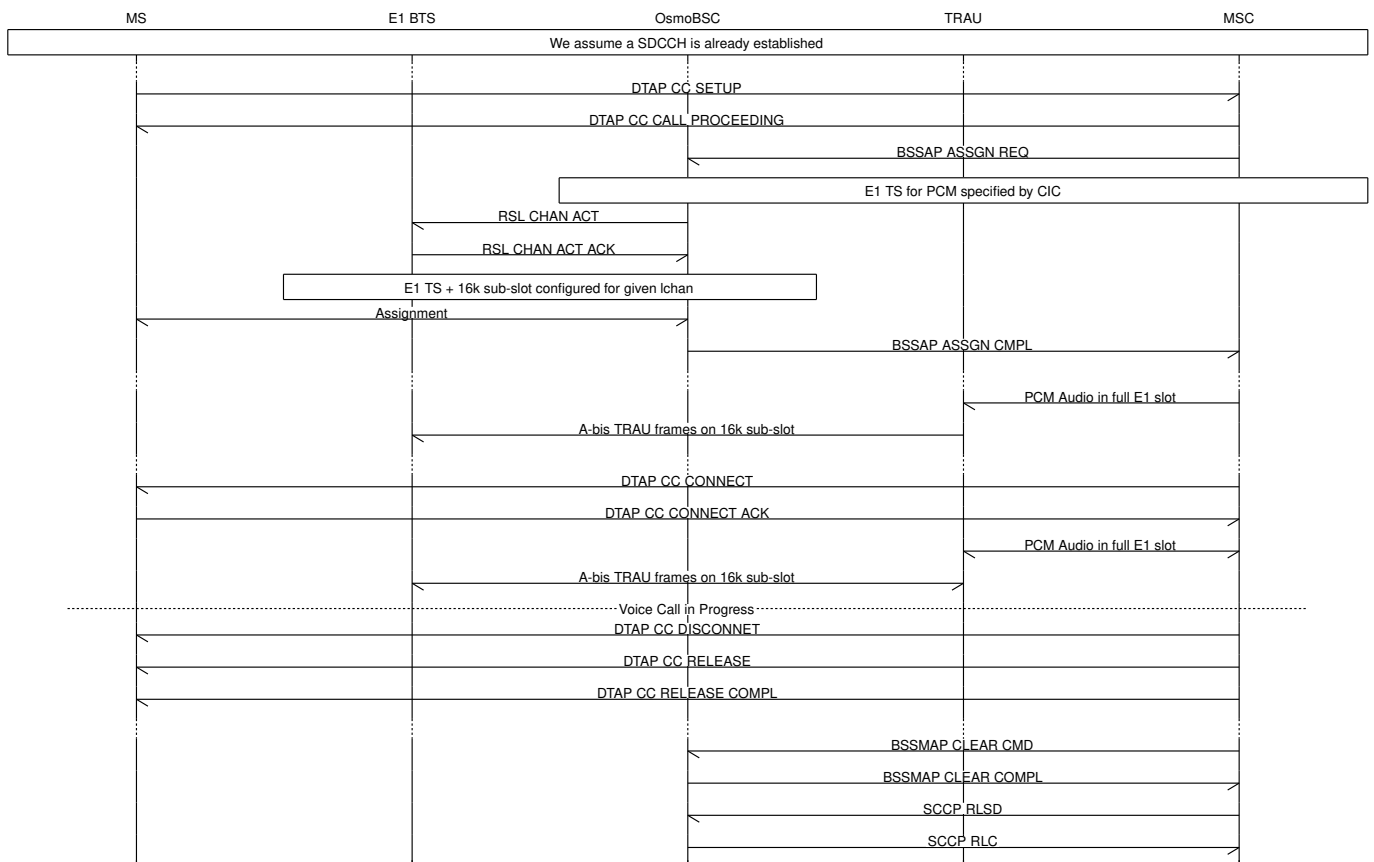
2.2 OsmoBSC 2010-2017: IPA-style A over SCCPlite

This configuration was introduced as early as 2010 in OpenBSC. It allowed the use of IP based BTSs (ip.access nanoBTS as well as all the OsmoBTS supported BTS models) in combination with third-party MSCs implementing a pre-standard, proprietary way of transporting the A interface over IP at a time where the 3GPP specifications only allowed classic TDM transport.
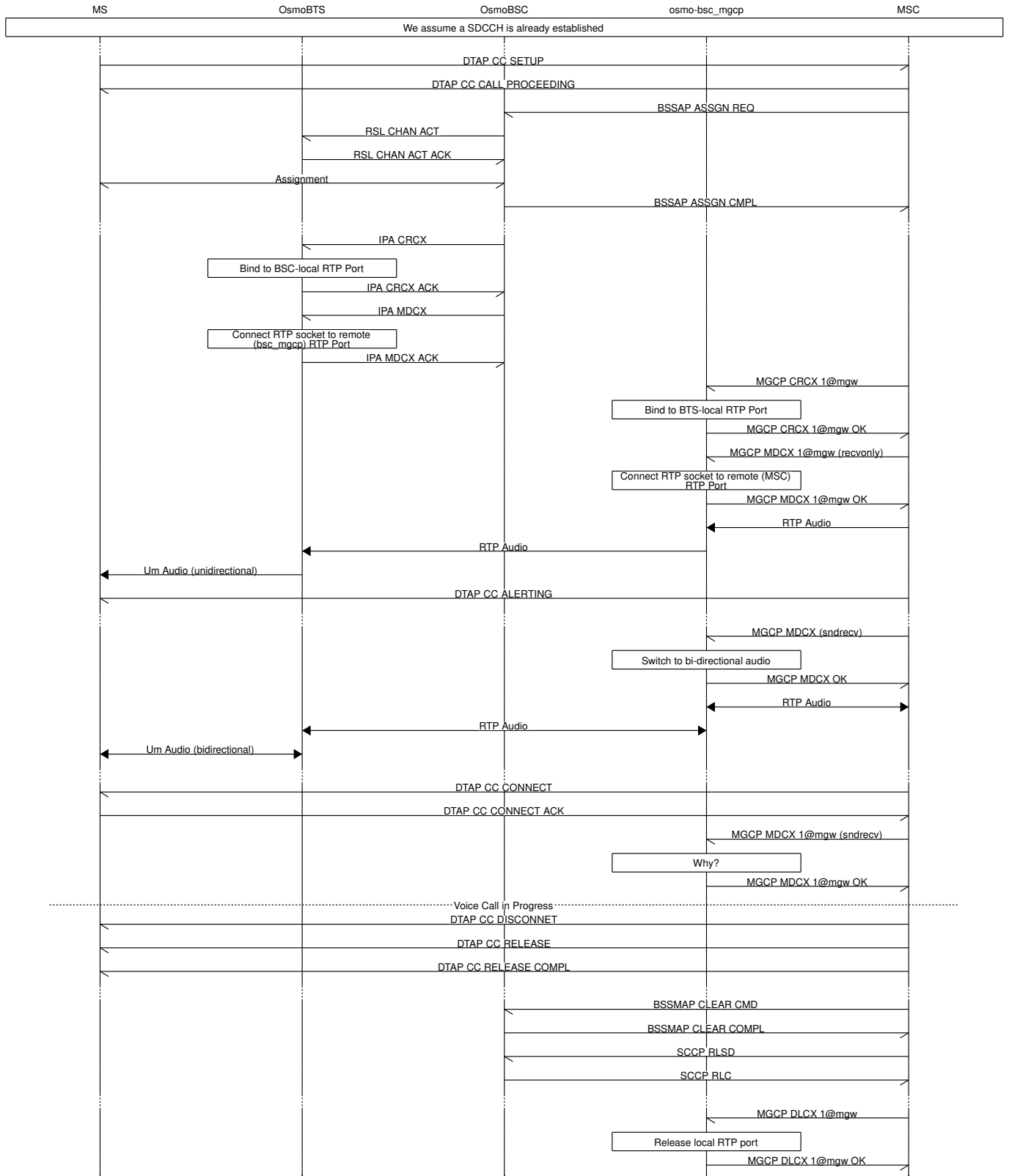
MS	OsmoBTS	OsmoBSC	osmo-bsc_mgcp	MSC

We assume a SDCCH is already established

DTAP CC SETUP

DTAP CC CALL PROCEEDING

BSSAP ASSGN REQ

RSL CHAN ACT

RSL CHAN ACT ACK

Assignment

BSSAP ASSGN CMPL

IPA CRCX

Bind to BSC-local RTP Port

IPA CRCX ACK

IPA MDCX

Connect RTP socket to remote
(bsc_mgcp) RTP Port

IPA MDCX ACK

MGCP CRCX 1@mgw

Bind to BTS-local RTP Port

MGCP CRCX 1@mgw OK

MGCP MDCX 1@mgw (recvonly)

Connect RTP socket to remote (MSC)
RTP Port

MGCP MDCX 1@mgw OK

RTP Audio

RTP Audio

Um Audio (unidirectional)

DTAP CC ALERTING

MGCP MDCX (sndrecv)

Switch to bi-directional audio

MGCP MDCX OK

RTP Audio

RTP Audio

Um Audio (bidirectional)

DTAP CC CONNECT

DTAP CC CONNECT ACK

MGCP MDCX 1@mgw (sndrecv)

Why?

MGCP MDCX 1@mgw OK

Voice Call in Progress

DTAP CC DISCONNET

DTAP CC RELEASE

DTAP CC RELEASE COMPL

BSSMAP CLEAR CMD

BSSMAP CLEAR COMPL

SCCP RLSD

SCCP RLC

MGCP DLCX 1@mgw

Release local RTP port

MGCP DLCX 1@mgw OK

2.3 OsmoBSC 2017+: 3GPP AoIP + Abis/IP

Release 7 of 3GPP included an official specification on how an interoperable A-over-IP (AoIP) interface shall look like.

As more modern MSCs at operators tend to favor implementing 3GPP AoIP rather than the proprietary SCCPlite based A interface, it becomes necessary for OsmoBSC to support this.

At the same time, for compatibility reasons, the classic SCCPlite support shall be kept, if possible with reasonable effort.
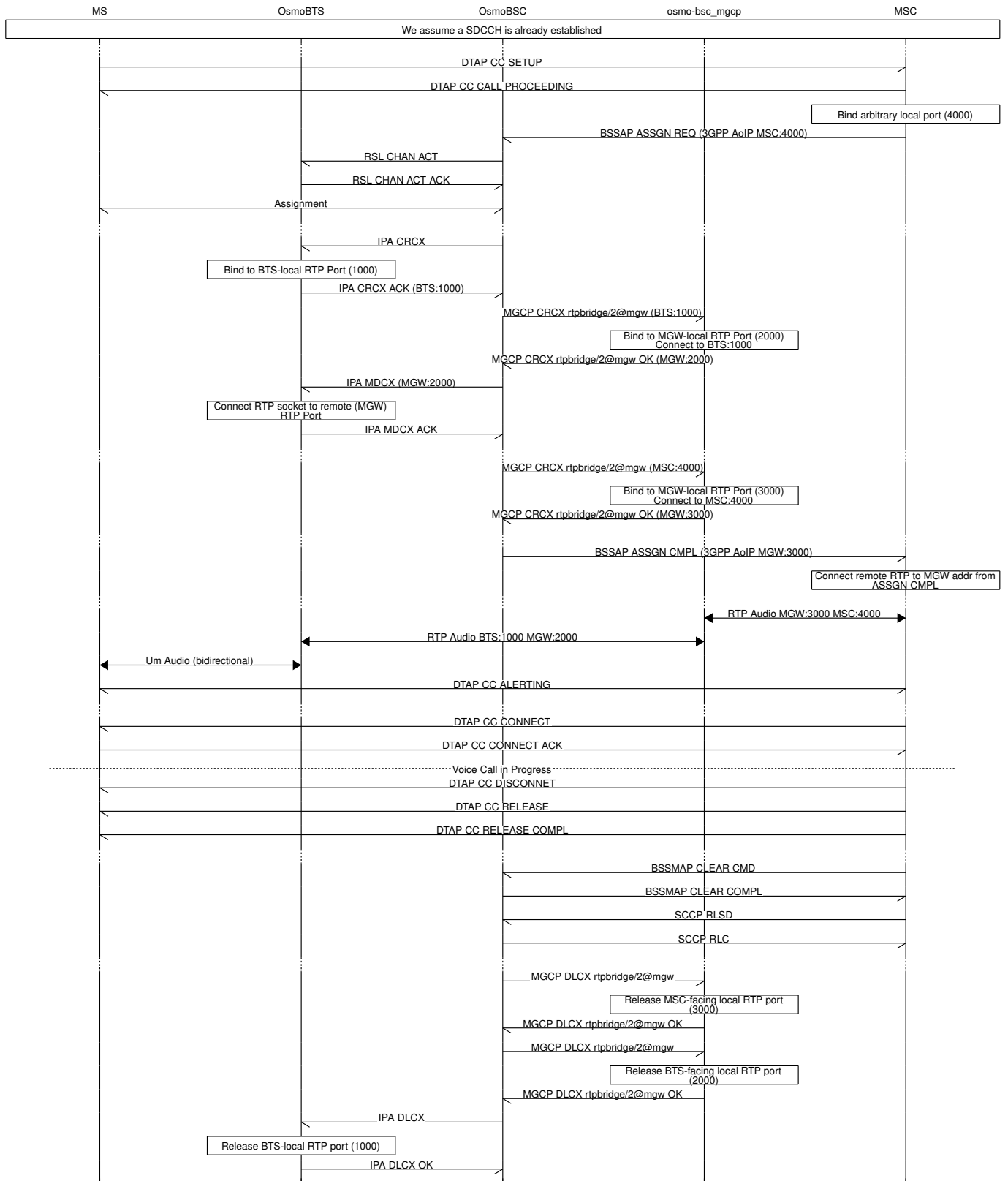
2.4   OsmoBSC 2017+: 3GPP AoIP + Abis/E1

Since OsmoNITB will soon be deprecated, we will use OsmoBSC in all Osmocom GSM ntework setups, requiring the support
for classic E1/T1 based BTSs from OsmoBSC.

MS	E1 BTS	OsmoBSC	osmo-bsc_mgcp	MSC

We assume a SDCCH is already established

DTAP CC SETUP

DTAP CC CALL PROCEEDING

Bind arbitrary local port (4000)

BSSAP ASSGN REQ (3GPP AoIP MSC:4000)

RSL CHAN ACT

RSL CHAN ACT ACK

Assignment

MGCP CRCX ts1/ss2@mgw (MSC:4000)

Bind to MGW-local RTP Port (3000)
Connect to MSC:4000

MGCP CRCX ts1/ss2@mgw OK (MGW:3000)

BSSAP ASSGN CMPL (3GPP AoIP MGW:3000)

Connect remote RTP to MGW addr from ASSGN CMPL

RTP Audio MGW:3000 MSC:4000

TRAU Frame Audio (E1 TS1 SS2)

Um Audio (bidirectional)

DTAP CC ALERTING

DTAP CC CONNECT

DTAP CC CONNECT ACK

Voice Call in Progress

DTAP CC DISCONNET

DTAP CC RELEASE

DTAP CC RELEASE COMPL

BSSMAP CLEAR CMD

BSSMAP CLEAR COMPL

SCCP RLSD

SCCP RLC

MGCP DLCX ts1/ss2@mgw

Release MSC-facing local RTP port (3000)

MGCP DLCX ts1/ss2@mgw OK