RAVENNA-2-SAP Converter

Installation + Operation Guide

Version 1.0

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1 Legal

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2   Introduction

The RAVENNA-2-SAP Converter is a freeware tool provided by ALC NetworX to help connecting RAVENNA devices to other AES67-enabled devices.

2.1   Background

When the *AES67 Standard for High-performance Audio-over-IP Interoperability* was published in 2013, all ingredients required to establish audio content interchange between different audio network systems based on IP were defined to its necessary minimum. A device or system supporting these definitions and requirements can successfully establish a synchronized stream connection to another AES67-enabled device or system.

However, since the standard focusses on interoperability, some advanced functions typically offered by various audio network solutions such as advertisement & discovery and connection management information exchange are left open as different methods and protocols exists which suitability depends on specific use cases and application environment.

Connection management involves the exchange of information describing specific stream characteristics and connection information. This data is called SDP data. For multicast connections, AES67 does not specify a specific method to transport the SDP data, it just assumes that devices and system offer a suitable way to retrieve and enter it. While most device or system manufacturers offer automatic means for conveying the SDP data between any sender and receiver within their system domain, the authors of AES67 simply assumed that manual methods exist (i.e. reading / copy SDP data from a sender's UI and entering / pasting the required data into a receiver's UI).

In RAVENNA, this data is conveyed by utilizing the RTSP protocol, which is a common method in Layer 3 (IP) streaming applications. Other systems (i.e. Audinate's Dante^{TM}) utilize the SAP protocol, an experimental protocol to announce available sessions (streams) with implicit SDP data transfer. Unfortunately, Dante-based devices offer no manual means for SDP data read-out or entry, they solely rely on SAP.

2.2   Motivation

While some RAVENNA devices have implemented the SAP method in addition to RAVENNA's standard method, we felt that it would be helpful to further ease interconnectivity if a generic RAVENNA-2-SAP Converter would be available. This would enable any device to connect to any available AES67 stream by their natively supported methods. Since RAVENNA and AES67 are based on an open technology approach utilizing the same principles and protocols, and RAVENNA has always emphasized on open interconnectivity, we decided to make the converter available as a freeware tool.

2.3 Features

- The RAVENNA-2-SAP Converter listens to any RAVENNA or SAP session (stream) announcements on the network and lists them in the respective boxes, displaying the most relevant information in configurable columns.
- The full SDP data set of each announced session can be displayed / copied.
- Selected announcements can be translated into the other protocol domain. translated announcements can be removed at any time.
- Local announcements can be created from SDP data conveyed by other means (i.e. manual data read-out / entry or copy & paste).
- In automatic mode, all incoming announcements (including those created locally) are immediately translated.
- Live status messaging and local event logging provided.

3 System Requirements

- The RAVENNA-2-SAP converter is a 32-bit Windows application operating on Windows 7 or higher.
- No specific hardware requirements apply.
- The PC needs to be able to access the related audio network.
- The program needs to be granted inbound and outbound access rights by the Windows Firewall system (or any other protection software).

4   Installing the Software

The RAVENNA-2-SAP Converter does not require an installation program. It can simply be stored and executed from anywhere. We recommend to follow these steps:

1. Download the RAV2SAP.zip file from the RAVENNA web site and open it.

2. Extract and store the RAV2SAP.exe file to the
   "C:\Program Files (x86)\RAVENNA\Tools" folder (create it, if it does not exist – will require administrator rights). You may also store the file in any other desired folder location.

3. Optional: Copy a program shortcut to the desktop or to a desired Windows Start directory location.

4. Extract and store the RAV2SAP.ini file to the "C:\ProgramData\RAVENNA\Tools" folder (create it, if it does not exist – will require administrator rights).

   Note: RAV2SAP will look for its .ini file in this directory; if it can't find it there, it will create a new .ini file with default settings. This may lead to incorrect operation.

5. Open the RAV2SAP.ini file in the ProgramData … folder with a text editor (left mouse button double-click).

6. Open the network settings and look for the network interface adapter name connecting your PC to the audio network:
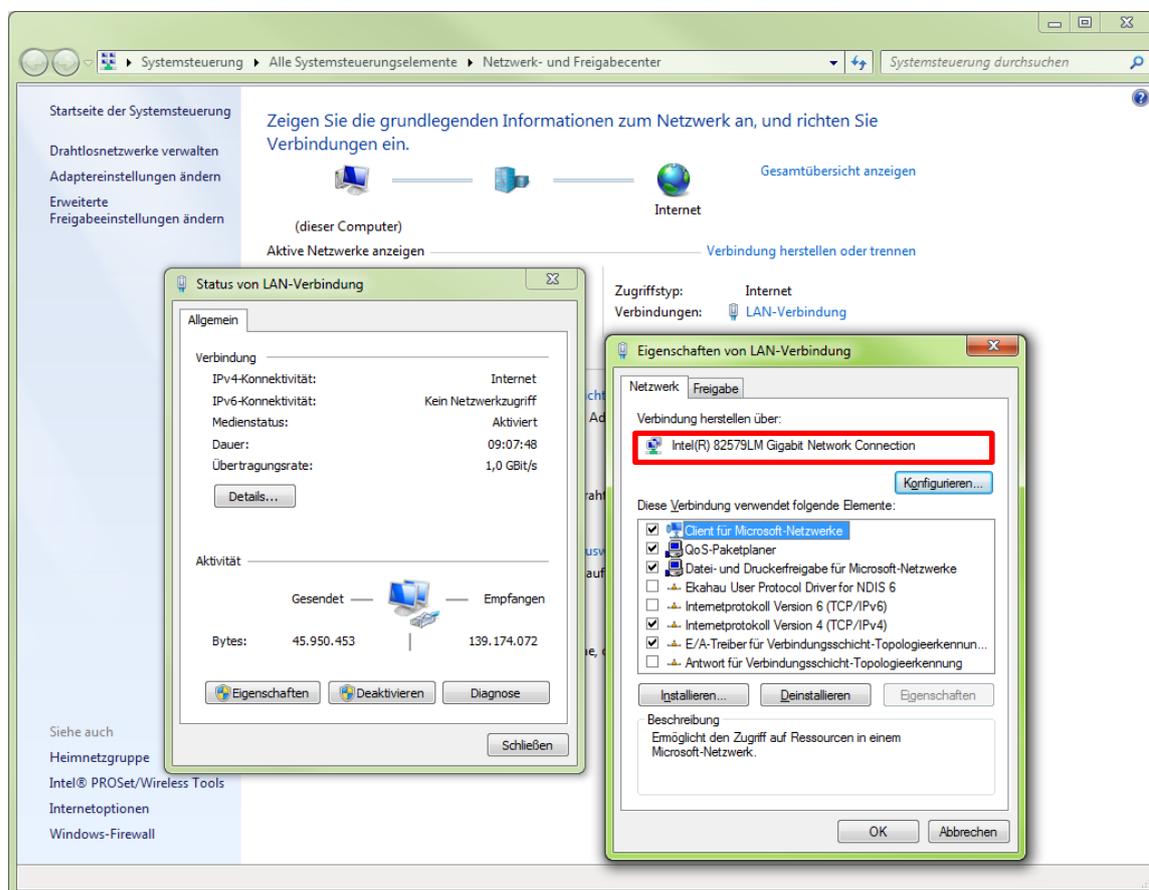
7. Under

   [Network]
   Interface=

   enter a partial string of the name uniquely identifying this network interface adapter. In the above example you may enter

   Interface=82579

   Store and close the RAV2SAP.ini file.

8. You may now run the RAVENNA-2-SAP Converter by starting it from the Windows Start menu or by double-clicking on the RAV2SAP.exe file in its stored location.

5 Operating Instructions

5.1 Important Notes

The RAVENNA-2-SAP Converter is a Windows application (not a service). Make sure the user account under which you are running this application has ample access rights (i.e. can access the audio network and is not blocked by Windows Firewall rules or other system policies).

The software needs to run at all times as both RAVENNA and SAP session announcement use connection time-out mechanisms: if a particular session announcement is not repeated within a certain time-out period, the session (stream) connection is removed.

5.2 Screen Layout

Once the RAVENNA-2-SAP Converter is started, the main window appears:
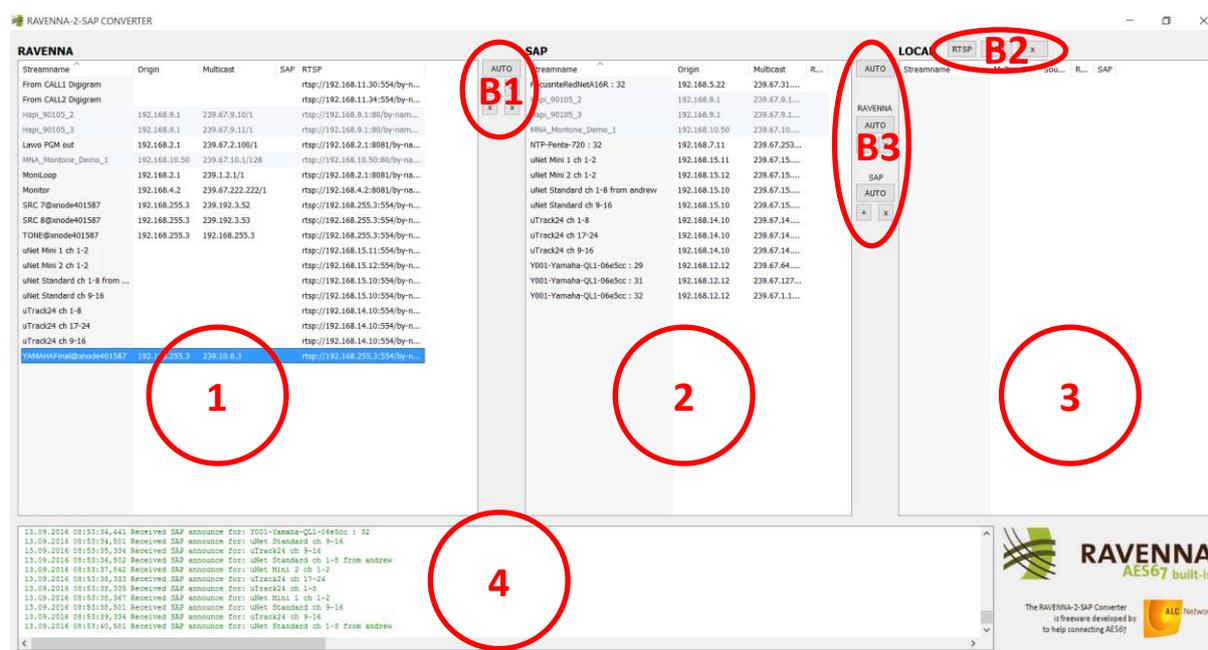
Area 1: Any RAVENNA session (stream) announcement discovered on the network is listed in this area. Information per session includes:

- Advertised session name (Bonjour announcement)
- Origin – IP address of announcing device
- Multicast address of related stream
- RTSP uri of related SDP data file
- SAP column indicating status of translation:
    - Empty – not translated
    - "W" – system is waiting for expected SAP time-out period in order to prevent multiple announcements for same session
    - "A" – session is translated into SAP

Area 2: Any session (stream) announcement discovered through SAP on the network is listed in this area. Information per session includes:

- Session name (s= line in SDP data record)
- Origin – IP address of announcing device
- Multicast address of related stream
- RAV column indicating status of translation:
  - Empty – not translated
  - "A" – session is translated into RAVENNA announcement

Area 3: Any locally created session (stream) is listed in this area. Information per session includes:

- Session name (s= line in SDP data record)
- Multicast address of related stream
- Source – indicating if local session has been created from manual SDP data entry or from RTSP uri
- RAV / SAP columns indicating status of translation:
  - Empty – not translated
  - "A" – session is translated into RAVENNA / SAP announcement

Common functions for all 3 areas:

Sort order and column configuration can be rearranged by common means: click on column header to change sort order, or rearrange columns by dragging them into the desired position or change their width with left mouse button on right column boundary. Columns may also be hidden by using right-mouse button on column header.

A double-click on any entry opens the detailed SDP data view. Data can be copied from here (ctrl-c). The SDP data of a locally generated session may also be edited in this window as long as this session has not been translated.

Area 4 is a real-time messaging window displaying incoming and outgoing announcements and immediate error conditions.

5.3   Translation Function

5.3.1   RAVENNA ⇔ SAP Translation

The buttons controlling RAVENNA to SAP translation and vice versa are located in **area B1**:
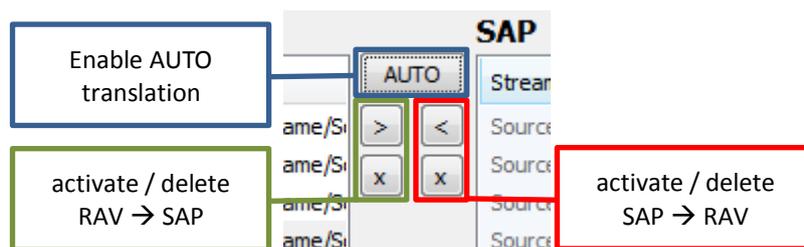
In order to translate an entry to the other side, mark the desired entry with the left mouse button and hit ">" or "<", respectively. Multiple entries can be selected at once (hold ctrl or shift key while selecting). Only entries with black text color can be selected for translation. Any entry with grey text color cannot be translated, either due to:

- detection of an already existing identical announcement in the other area, or
- because it had been generated from a local session announcement, or
- because of SAP time-out waiting after initial announcement detection (temporary condition).

Any active translation will be marked with an "A" in the respective column. To remove an active translation, select the desired entry / entries and use the related "x" button. Note: the **left** "x" button will remove active RAV → SAP entries selected on the **left** side from the right side, and vice versa. In other words: both **left buttons** work on entries on the **left area** (RAVENNA) only, the **right buttons** apply to the **right area** only (SAP area).

Note: In order to prevent duplicate entries, a time-out waiting period applies to newly discovered announcement (indicated by "W" in the status column).

Removed or deleted announcements detected by the software are automatically removed from the respective list and are also removed from translation.

The **"AUTO" button** toggles auto translation mode. When activated, any detected announcement is automatically translated to the other side. The individual translate / remove buttons are disabled as long as auto mode is activated.

5.3.2 Local Session Creation

In order to support announcement of sessions (streams) offered by devices or systems which do not utilize RAVENNA or SAP announcement methods, local session announcements can be created. You would either need to get hold of the SDP data set for an available session (stream) by manual means (i.e. manual read-out or copy & paste access) or need to know the RTSP uri for the related SDP data file.

In order to create a local session announcement, select the data input type (SDP or RTSP) from **button area B2**. In case of **manual SDP data entry**, enter the related SDP data as provided by the offering device into the edit window. You can type or copy & paste (ctrl-v). When ready, hit OK and the new locally created session announcement appears in **area 3**. You can reopen the SDP data window at any point in time; however, changes can only be applied as long as it has not been translated into RAVENNA or SAP announcements.

To **create** a **local session from** an existing **RTSP file**, hit the "RTSP" button and enter the respective RTSP uri in the appearing entry box. Once created, the software tries to retrieve the SDP data file from the given location using the RTSP protocol. If the SDP data could be retrieved successfully, it will be displayed as a new local session. The retrieved SDP data can be displayed (but not edited) by double-clicking on the related entry. If SDP data retrieval was not successful, an error will be logged into the messaging window and the related entry remains empty.

To **remove a locally created session** announcement, select the desired entry and use the "x" button in the B2 area. Any active translation will automatically be removed.

5.3.3 Translation of a locally created Session

In order to activate the announcement of a locally created session for RAVENNA or through SAP, use the respective buttons of **area B3**. Select the desired announcement from the local entries list (again, selection of multiple entries is possible) and use the "+" buttons to add an announcement to RAVENNA or SAP respectively. The "x" buttons remove the respective announcements of the selected entries from the related list. The locally created session announcements remain in the list for later use. The status of the translation is indicated in the RAV and SAP columns.

AUTO mode is individually available for RAVENNA or SAP translation, as well as for full automatic translation of any newly created local session announcement to both RAVENNA and SAP (upper AUTO button in **area B3**)

5.3.4 Special Features

When translating RAVENNA announcements or locally created session announcements into SAP, SDP attribute ordering is enabled by default. This is required in combination with Dante devices as they expect the line-up of the SDP attributes in a very specific order. You can easily check the difference by opening the detailed SDP data view from a RAVENNA announcement or a locally created announcement and compare it with the SDP data order of the related SAP translation.

If SDP attribute reordering is not desired, it can be switched off by setting the related entry in the RAV2SAP.ini file to 0:

[Settings]
DoSDPSort=0

5.4 Logging

A log file will be written as specified in the related section of the RAV2SAP.ini file:

[Logging]
Directory=" C:\ProgramData\RAVENNA\Tools "
Filename=Rav2Sap.txt

5.5 Error Conditions

5.5.1 Start-up Errors

- "Using NIC unknown interface, IP" – the specified network interface could not be found
  → check related setting in RAV2SAP.ini again (see step 6 + 7 in "*Installing the Software*").

- "Start SAP listening failed" – either the specified network interface could not be found (see above), the software failed to open the SAP port or was not able to successfully join the SAP multicast group (239.255.255.255:9875)
→ check related setting in RAV2SAP.ini again (see above), make sure the PC is connected to the related audio network, check Windows Firewall settings or try another network adapter; it may also be the case that another application / service has opened the SAP port in exclusive mode, in this case try starting the RAV2SAP.exe before the other application / service (RAV2SAP is opening this port in shared mode).

- "Check RTSP server port xxxx failed" – the software was not able to open the specified port for RTSP operation; most likely another application or service is already using this port – this may happen if the RAVENNA Virtual Sound Card provided by ALC NetworX is using the same port (for RTSP)
→ change RTSP port setting in RAV2SAP.ini (i.e. to 8082):

[Network]
Interface=xxxx
RTSPPort=8082

5.5.2 Errors during Operation

- "Get SDP on Interface xxxx for rtsp://… failed, State = received data: RTSP/1.0 404 Not Found" – the specified RTSP uri could not be found
→ double-check provided or entered RTSP uri, check for invalid characters (spaces need to be represented as %20), remove and create locally created RTSP session again