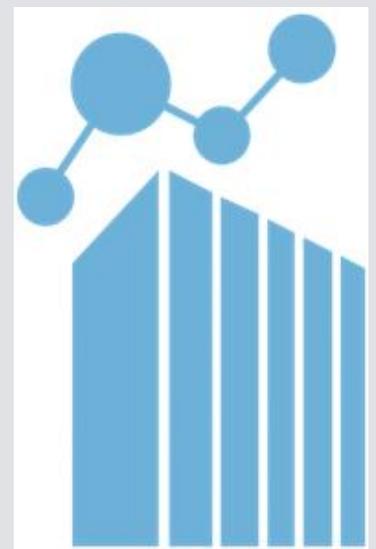
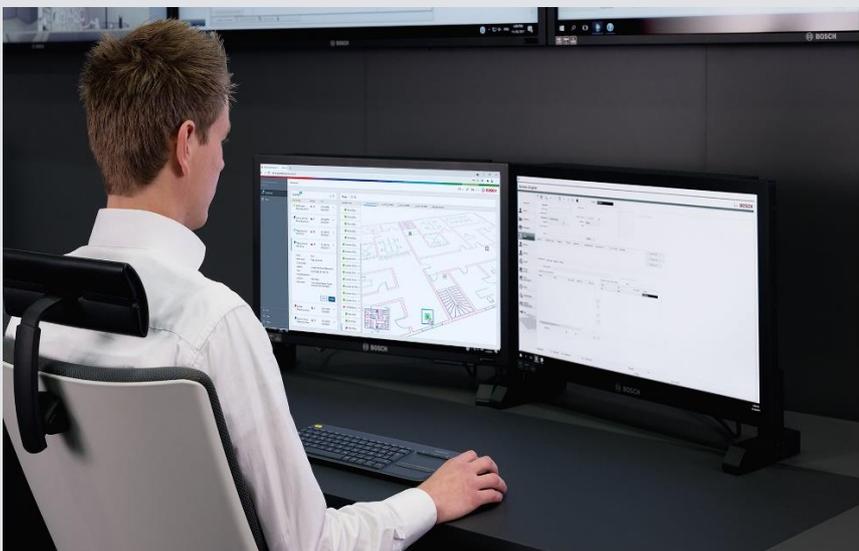


Integration solution

IP Horn Loudspeaker - Bosch Building Integration System

An Automated Audio-intervention Solution



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1. Overview of the Integration

1.1 Introduction

In many Vertical Markets where people are on the move, the integration of central monitoring and sophisticated security systems featuring automated audio assistance stands as a pivotal and highly sought-after capability. This integration yields substantial benefits, with noteworthy examples including:

- A Building Integration System (BIS) Operator, equipped with real-time situational awareness, can swiftly respond to critical situations or alarms. They possess the capability to dispatch carefully curated pre-recorded messages to precisely target the affected areas, mitigating potential risks and enhancing overall security measures.
- The Building Integration System (BIS) is designed to intelligently detect state change events within the environment. This automated intelligence allows BIS to trigger timely warning messages autonomously, aligning responses with specific conditions or events. This proactive approach ensures that potential issues are addressed promptly, even in the absence of direct human intervention.

Prior to deploying an IP Horn Speaker for the purpose of broadcasting pre-recorded messages over an IP network, meticulous attention to programming is paramount. Both the IP Horn Loudspeaker's configuration and the Building Integration System (BIS) settings must be precisely tuned to seamlessly activate and deliver messages, ensuring that the intended audience receives vital information promptly and efficiently.

1.2 Which Bosch products can be used for this integration.

1.2.1 IP Horn Loudspeaker and Amplifier types

The supported Types are:

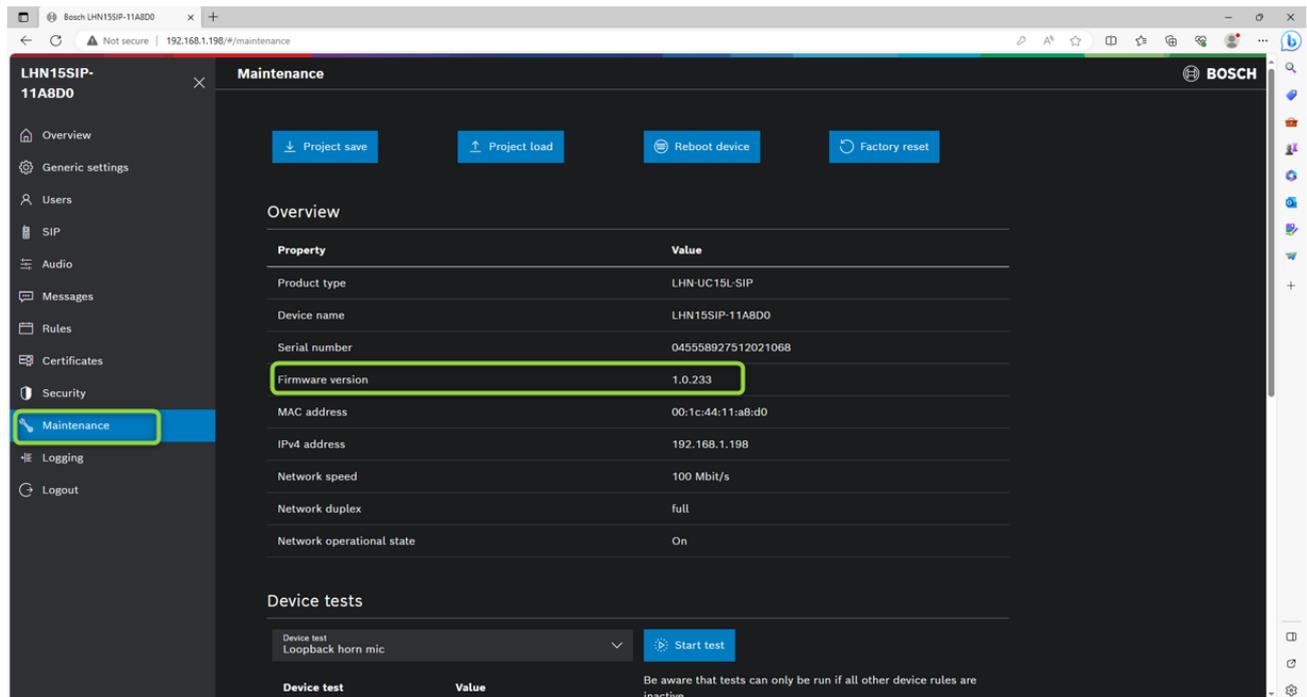
- LHN-UC15L-SIP
- LHN-UC15W-SIP
- AMN-P15-SIP

Minimum Firmware required:

Bosch_LHN15SIP_Firmware_V1_0_233 (=Release Version)



Firmware of IP Horn speaker can be verified from Maintenance page.



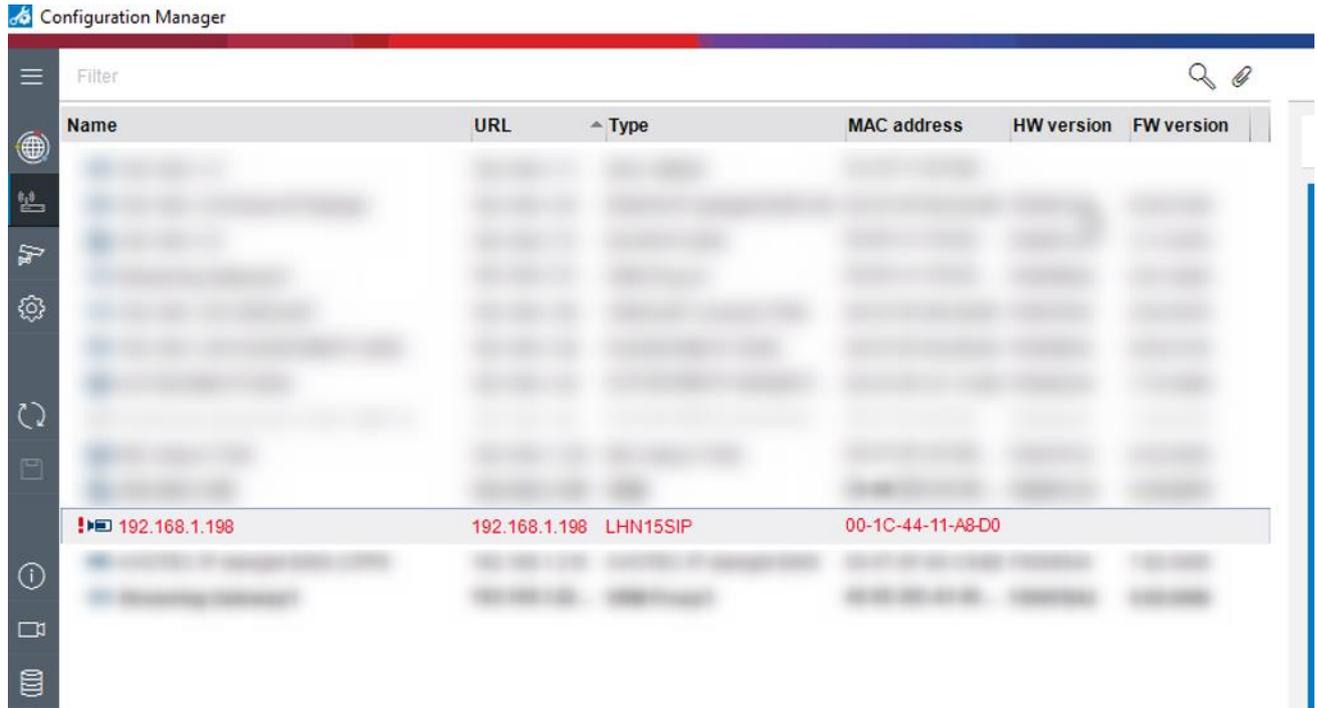
1.2.2 Which BIS versions are supported for audio integration?

- In principle all BIS versions support this feature, Alarm Management Package (BIS-FGEN-AMPK) license is needed in BIS for this integration.
- For this testing, BIS 5.0 is used.

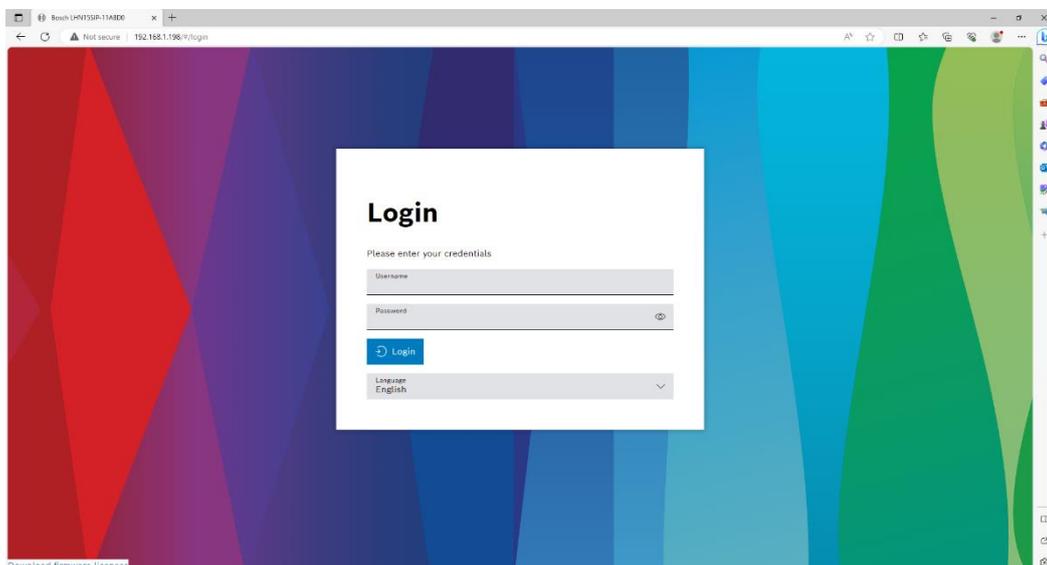
2. How to set up the IP Horn Loudspeaker for this integration

The IP Horn Speaker can be activated using an external generated HTTP call that triggers the internal Virtual General-Purpose Input (VGPI). An input triggered can then be predefined to activate for instance a predefined message.

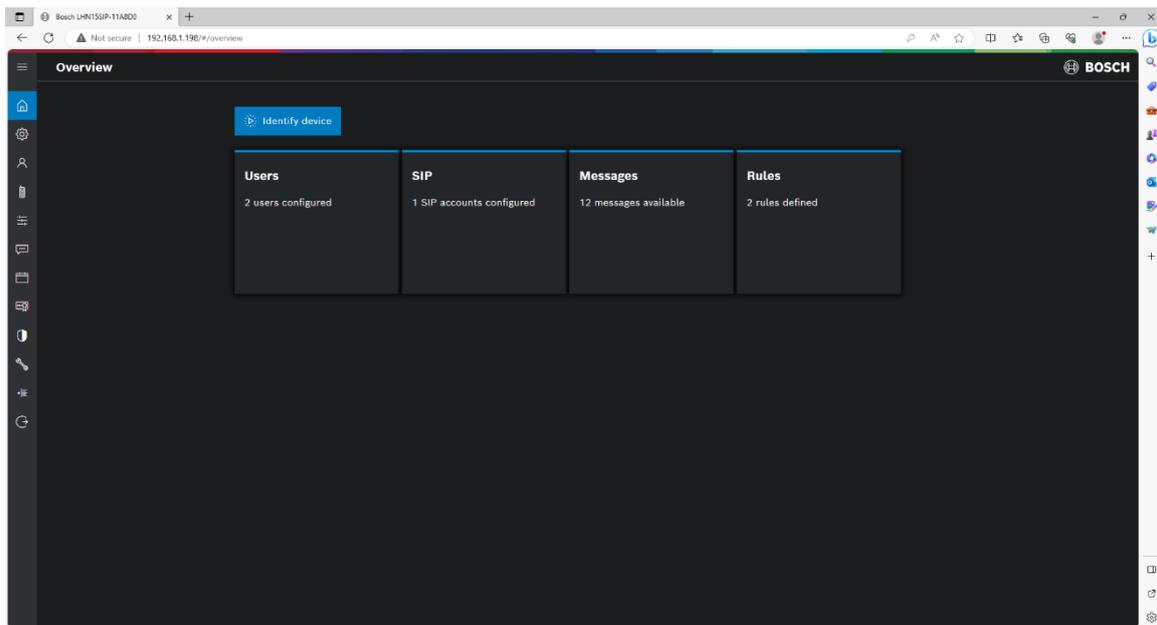
2.1 Scan the IP Horn Loudspeaker from Configuration Manager



2.2 Login to the webpage of IP Horn Speaker



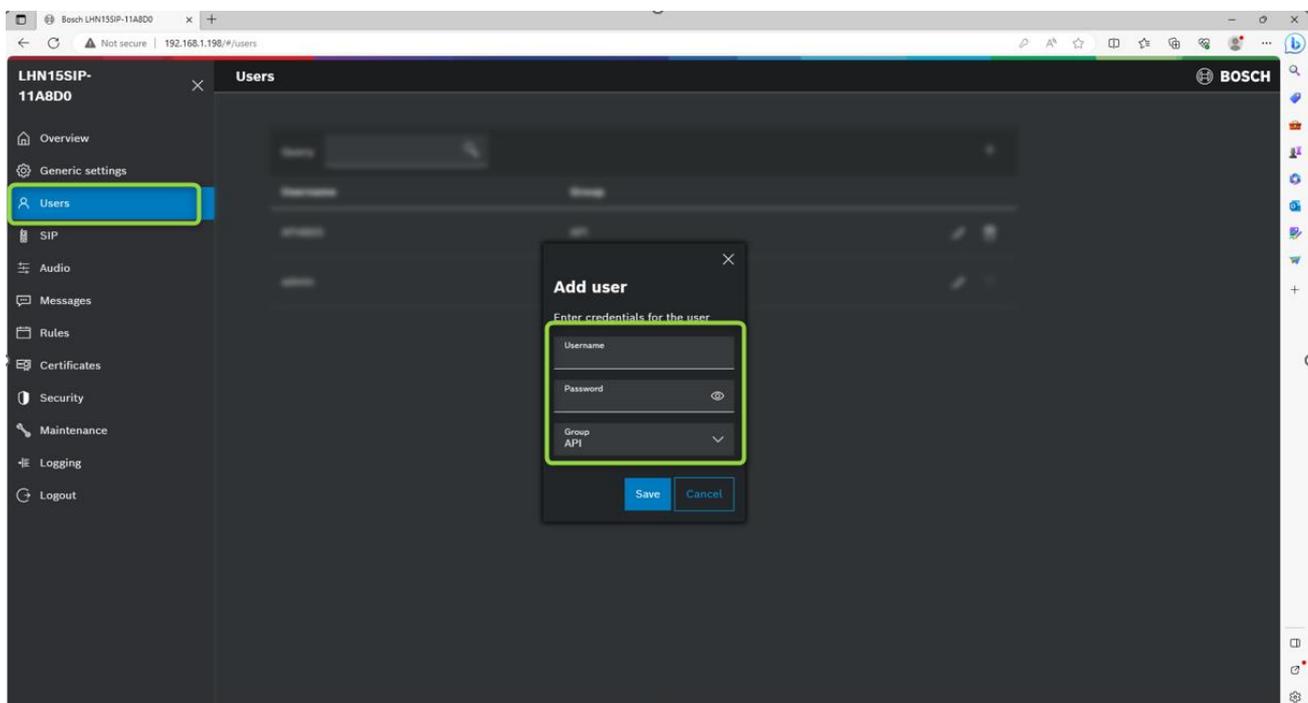
After Login below page will be displayed

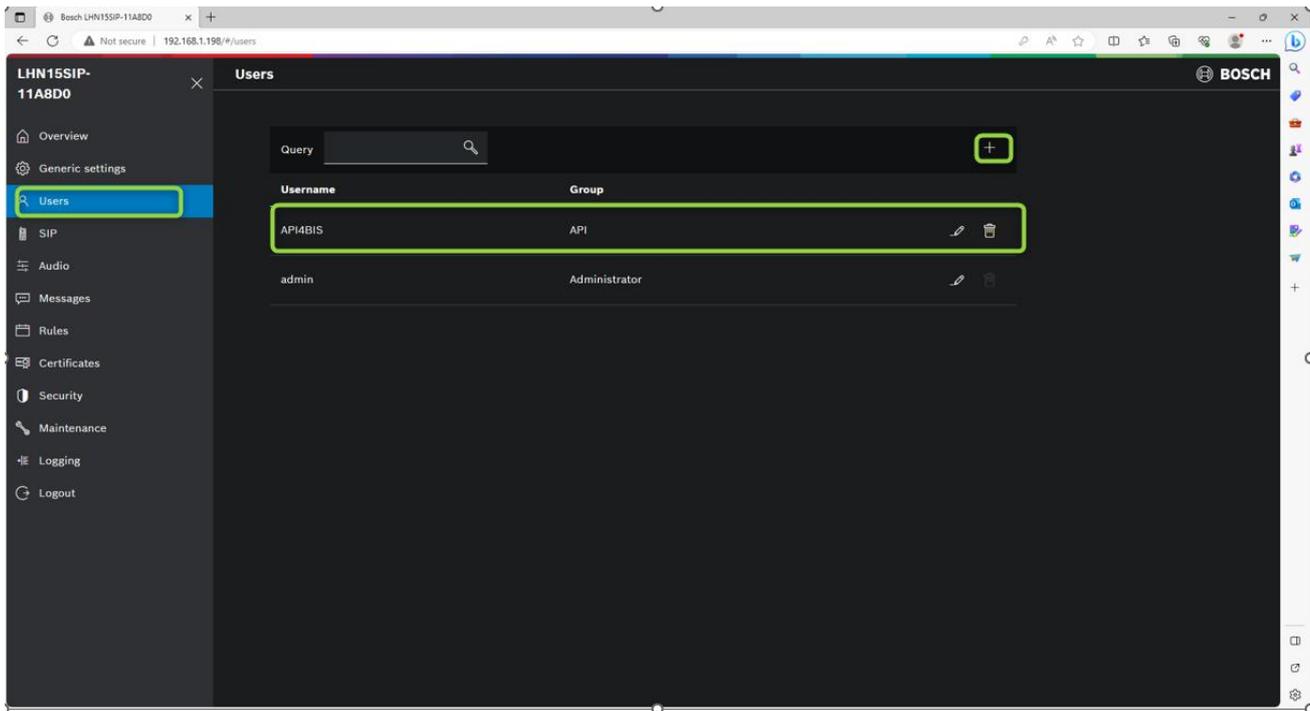


The following settings have to be programmed in the IP Horn Speaker to achieve integration.

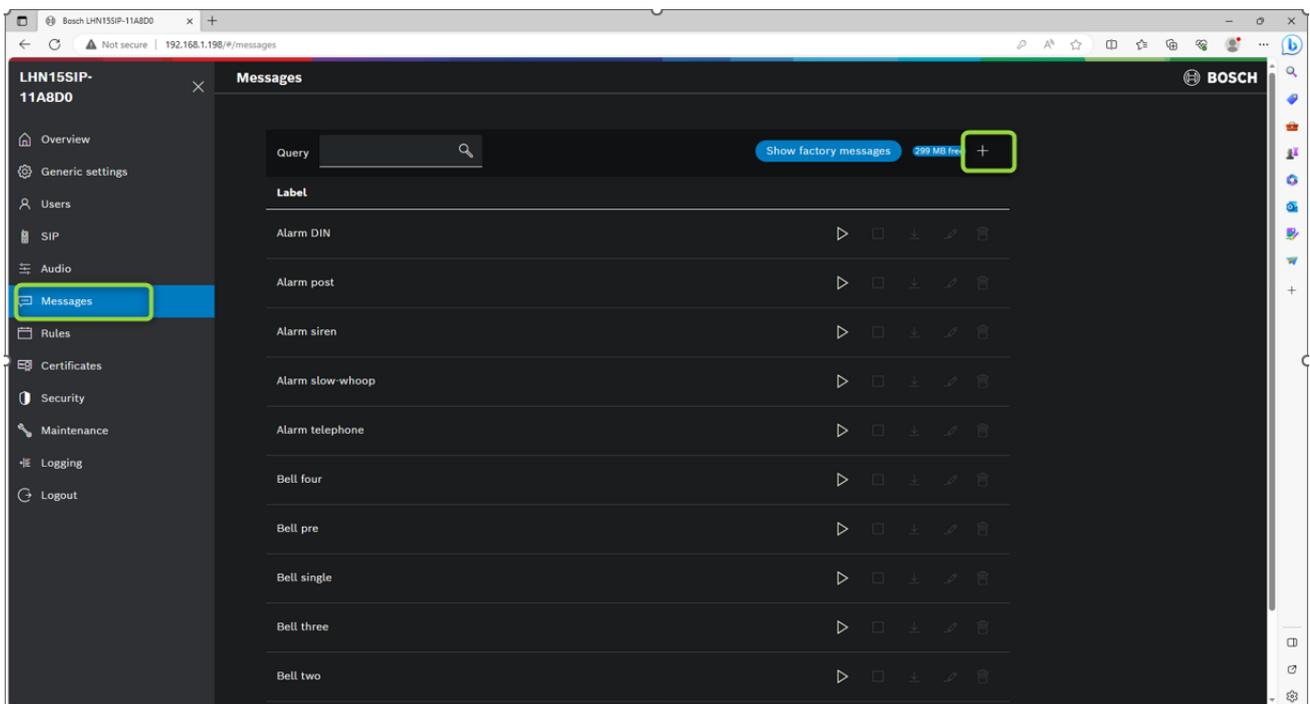
2.3 Create a new user with access to group API only.

Navigate to users' menu and create a new user which will be used via RESTAPI

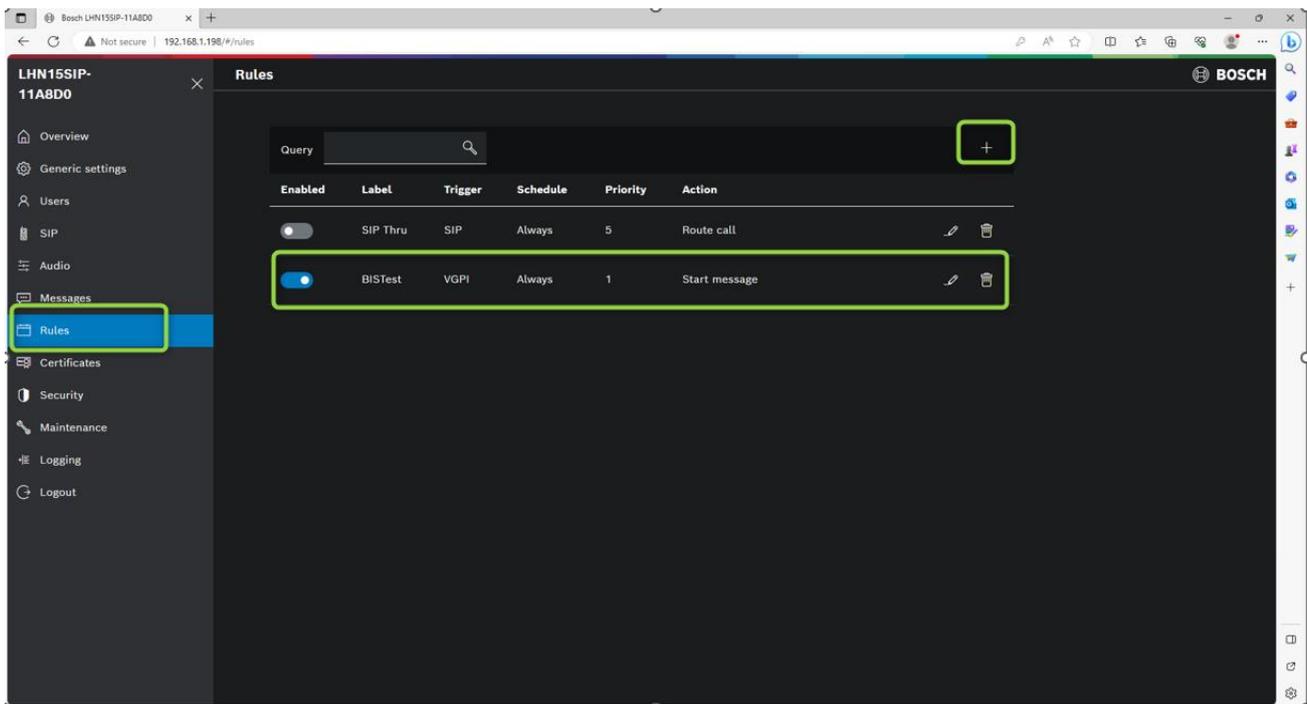




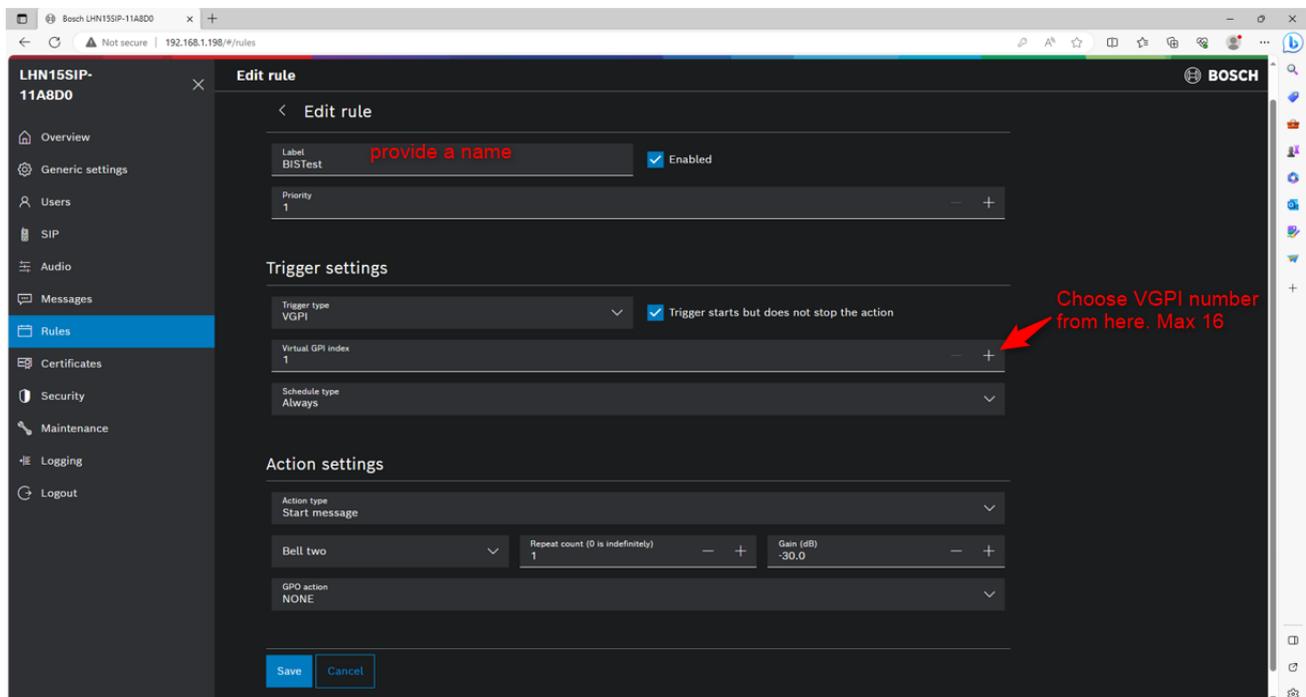
2.4 Import your customized audio file if necessary.



2.5 Create a new Rule.



The Rule menu looks like this:



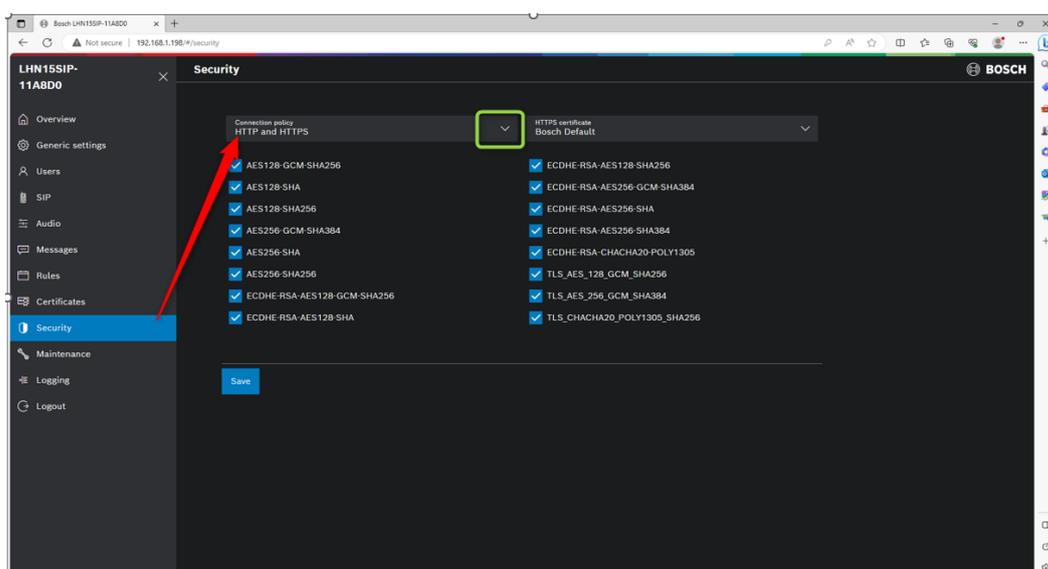
2.5.1 Hints on setting a new Rule.

Take note of the following:

- Priority is up to you to define.
- Trigger Type should be VGPI
- Virtual GPI Index – there are a total of 16 Virtual GPI available (1-16)
- If you need to trigger multiple type of audio message, use a different Virtual GPI for each message.
- Action Settings:
 - Type should be Start Message
 - “Trigger starts but does not stop the message” needs to be selected, avoiding a message cut off whenever a stop command is received. By selecting this option, the audio message will completely play ignoring any stop command entering before the audio message playback finishes. See also the timers comment in the script source codes below to match the playback time and virtual input toggle time needed to avoid message repeats or cut-offs.
- GPO action can be set to activate physical output (relay) as well as virtual output (Rest API), in the IP Horn speaker.

2.5.2 Hints on using HTTP or HTTPS

The IP Horn Speaker Web browser config software lets you define in the Security Menu what type of communication policies the IP Horn Speaker must use. You can select HTTP or HTTPS or both.



This completes the basic settings of the IP Horn Speaker.

You can now proceed to integrate the IP Horn Speaker with Bosch Building Integration System.

3. Integration of the IP Horn Speaker with Bosch Building Integration System (BIS)

Note: Make sure you have programmed the IP Horn Loudspeaker as illustrated above first.

The IP Horn Speaker can produce messages automatically invoked by REST API. A REST API (Representational State Transfer Application Programming Interface) via HTTP is a way for software applications to communicate and exchange data over the internet using the principles of REST architecture.

3.1 Test the REST API from Command line.

To interact with a REST API via the command line, you can use various tools and utilities that are available in most operating systems, including “curl” and “httpie”:

We will use CURL for our test.

CURL is a command-line tool and library for transferring data with URLs. It is a versatile and widely used tool that allows you to make HTTP requests to interact with web services and perform various network-related tasks directly from the command line.

The below curl commands allow you to perform HTTP POST request from the command line to IP Horn Loudspeaker. HTTP POST requests are used to send data to a server, typically to create or update resources.

Below command is used to change status of VGPI 1 to True state

```
curl -X POST "http://192.168.1.198/api/ext/v1/vgpis/1" -H "accept: */*" -u "API4BIS:admin123" -H "Content-Type: application/json" -d "true"
```

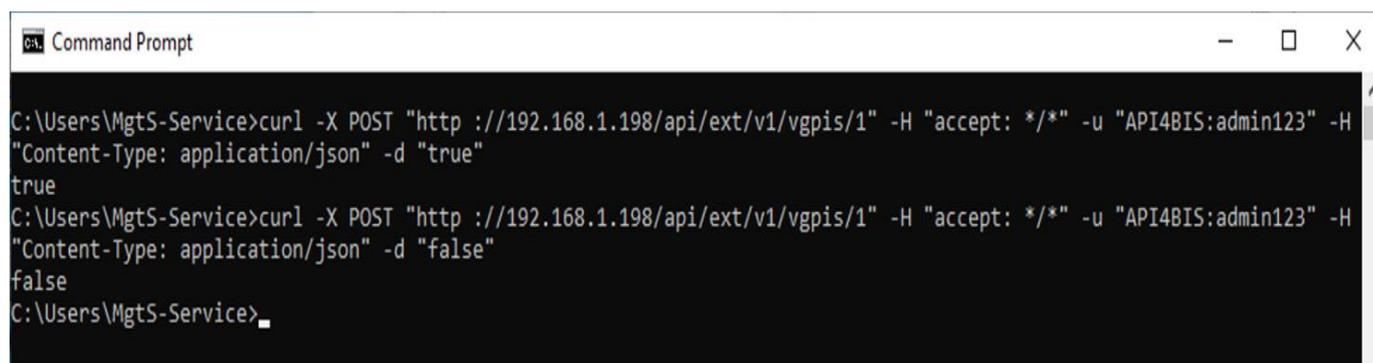
Below command is used to change status of VGPI 1 to false state

```
curl -X POST "http://192.168.1.198/api/ext/v1/vgpis/1" -H "accept: */*" -u "API4BIS:admin123" -H "Content-Type: application/json" -d "false"
```

Hints:

1. The above script example has the following settings:
 - a. IP Horn Speaker IP address: 192.168.1.198. (Please adapt to your local IP used)
 - b. Username of IP Horn Speaker created in chapter 2: API4BIS (Please adapt to your user)
 - c. Password of user created in chapter 2: admin123 (Please adapt to your password)
 - d. In the IP Horn Speaker, VGPI “1” should be pre-defined to launch a message.
2. The “true” command to the IP Horn Speaker when IVA rule 1 triggers and changes the state of VGPI 1 to true
3. The “false” command to the IP Horn Speaker when IVA rule 1 triggers and changes the state of VGPI 1 to false

Test the commands from command line.



```
Command Prompt
C:\Users\MgtS-Service>curl -X POST "http://192.168.1.198/api/ext/v1/vgpis/1" -H "accept: */*" -u "API4BIS:admin123" -H "Content-Type: application/json" -d "true"
true
C:\Users\MgtS-Service>curl -X POST "http://192.168.1.198/api/ext/v1/vgpis/1" -H "accept: */*" -u "API4BIS:admin123" -H "Content-Type: application/json" -d "false"
false
C:\Users\MgtS-Service>
```

3.2 Testing with BIS Associations

Associations (also known as Jobs) are the IF-THEN rules which govern the behavior of the BIS system. When the BIS server is running its State Machine constantly monitors the states of connected devices, timers and messages, and matches them against all the Associations that are stored in the currently loaded configuration.

Whenever one of the TRIGGERS of an Association is fulfilled, then the State Machine executes that Association. First it checks that all additional prerequisites (i.e. the IF clauses) are fulfilled, and if so, carries out the commands in the THEN clauses. Otherwise it carries out the actions in any ELSE clauses that the Association may have.

The key elements in an Association are therefore:

- Triggers (preconditions)
- IF clauses (additional conditions, linked by a logical AND). Note: IF clauses are optional, because Triggers by themselves can play the role of preconditions for the Association.
- THEN clauses
- ELSE clauses

Timers are one of the elements of associations, Timers are visible only inside of the JOB where they have been created.

Timers can be used in:

- triggers
- controls

Timers can be used to count seconds.

Timers' states:

- Running (when it is counting/running)
- Stopped (when it was stopped by Control element)
- Timed out (when it reached the end of the set time)

3.3 The integration of the IP Horn Loudspeaker in a BIS System

Note: Make sure you have programmed the IP Horn Loudspeaker as illustrated in chapter 2 first.

The IP Horn Speaker can produce messages automatically invoked by events in a BIS system using Associations or simply manually by a BIS Operator using a custom command on a virtual detector in Device overview or on a Map. Such a message call can be the result of a programmed command to execute.

It is also possible to run the start/stop commands manually by right click on address ApplicationLauncher.Start followed by “Start application” command from BIS client → Device overview window.

3.4 Calling an IP Horn Loudspeaker by an Association in BIS

In the below example, we want to trigger IP Horn speaker when Virtuell.1 detector changes the state to 1-Detector masking.

IF virtuell.1 changes state from * To 1-Detector masking

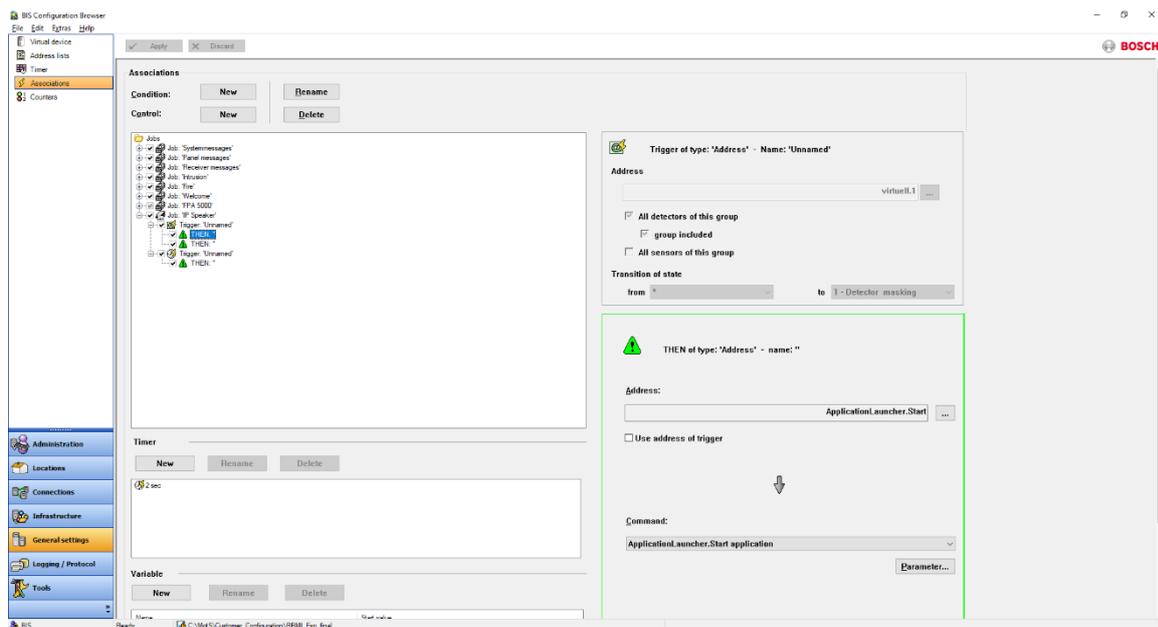
THEN

Start Application Launcher with command line CMD as below.

```
cmd /C curl -X POST "http://192.168.1.198/api/ext/v1/vgpis/1" -H "accept: */*" -u "API4BIS:admin123" -H "Content-Type: application/json" -d "true"
```

THEN

Start timer for 2 seconds. (Timer can be adjusted based on the actual recorded message time)



Parameter entry

Command: Start application

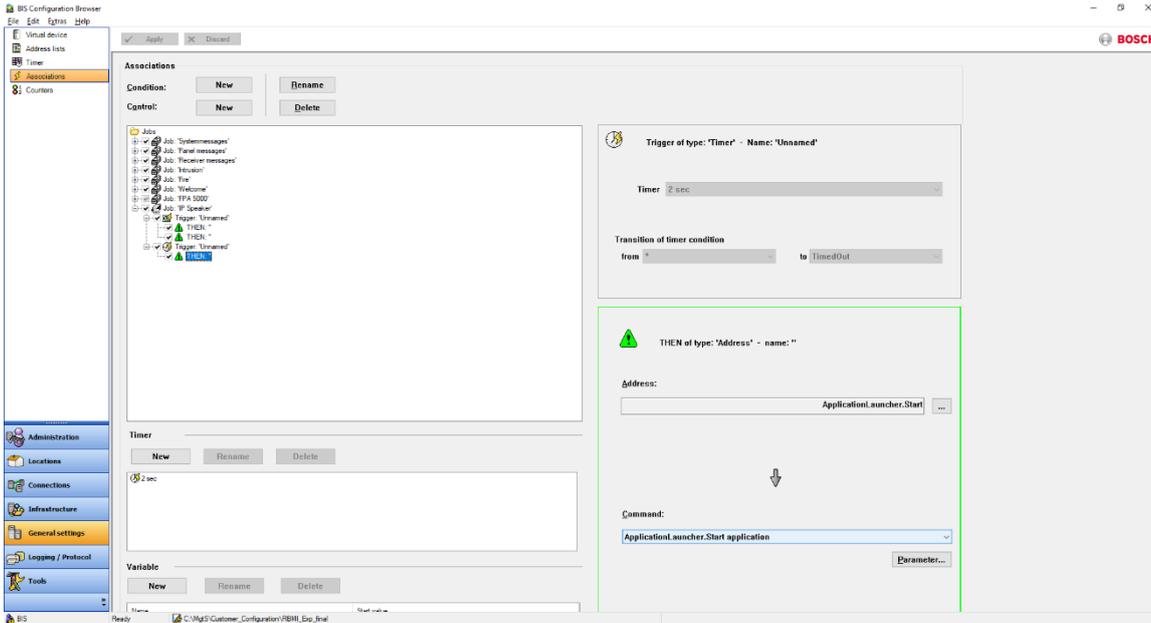
Description: Starts an application with parameters

Parameter	Value	Note
Command line	e: application/json"-d "true"	Fully qualified application path including parameters
Timeout	2	Timeout for supervising the application [sec]
Terminate applicat...	1	Terminate the application after timeout? (1=yes, 0=no)

```
cmd /C curl -X POST "http://192.168.1.198/api/ext/v1/vgpis/1" -H "accept: */*" -u "API4BIS:admin123" -H "Content-Type: application/json" -d "true"
```

The screenshot shows the 'BIS Configuration Browser' window. On the left, a tree view shows the configuration hierarchy with 'BIS-3' selected. The main area is divided into sections: 'Associations' (with 'Condition' and 'Control' buttons), 'Timer' (with 'New', 'Rename', and 'Delete' buttons), and 'Variable' (with 'New', 'Rename', and 'Delete' buttons). The 'Timer' configuration is active, showing a 'Trigger of type: Address' with 'Name: Unnamed' and 'Address: virtuell.1'. Below the trigger, there are checkboxes for 'All detectors of this group' and 'All sensors of this group'. The 'Transition of state' is set from 'X' to '1 - Detector masking'. The 'THEN' section is highlighted in green and shows a 'Timer' set to '2 sec', a 'Control' dropdown set to 'START', and a 'Timeout' field set to '2' seconds.

When Timer stops, we need to send command again to IP Horn speaker to stop the message.



Parameter entry

Command: Start application

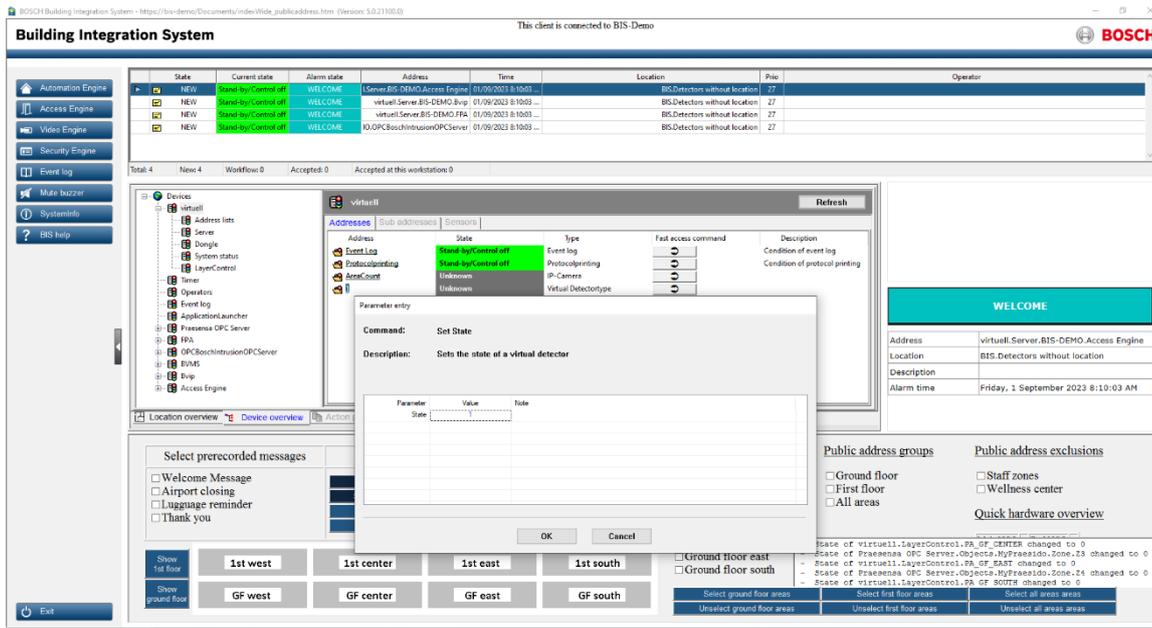
Description: Starts an application with parameters

Parameter	Value	Note
Command line	: application/json" -d "false"	Fully qualified application path including parameters
Timeout	2	Timeout for supervising the application [sec]
Terminate applicat...	1	Terminate the application after timeout? (1=yes, 0=no)

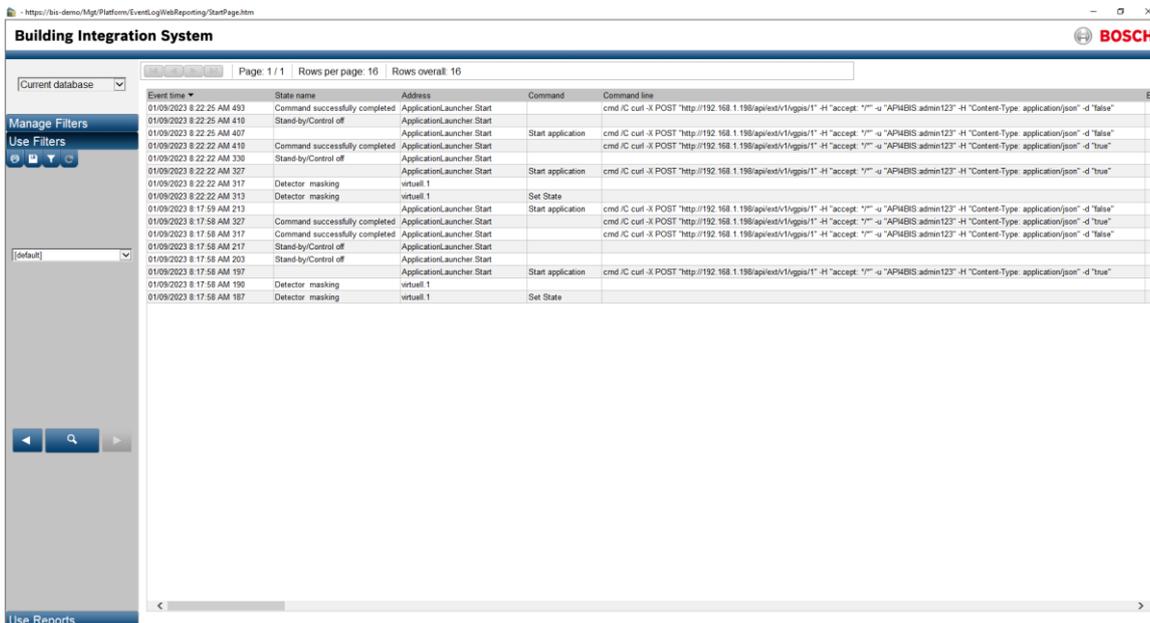
```
cmd /C curl -X POST "http://192.168.1.198/api/ext/v1/vgpis/1" -H "accept: */*" -u "API4BIS:admin123" -H "Content-Type: application/json" -d "false"
```

Note : When timer stops message does not immediately stop but after the message has finished

Below screenshot show triggering virtual detector



Below screenshot show eventlog and commands sent from BIS to activate IP Horn speaker.



Disclaimer

Bosch cannot accept any liability on the implementation or use of scripts mentioned in this document. Your activity in developing products that interface with Bosch products is at your own risk and responsibility regarding fitness for use, completeness, faultlessness, or any claims of third parties which may arise based on such further development.

