TEST REPORT LIFESIZE UVC CLEARSEA

PDF version (optimised for print)
GENERAL

PERIOD

December 2013 - February 2014

SW VERSION

The server-side software versions of LifeSize UVC Platform and LifeSize UVC ClearSea were LS_UVC_1.2.4(10) or LS_CS_4.0.3(40). On the client side, the software version 8.2.6 (build 61263) was used.

DEVICE CLASS

LifeSize UVC ClearSea is a client-server system. The clients are connected to the server via SIP. A gateway functionality to external H.323 and SIP devices exists, which can also register on the server side.

SCOPE OF DELIVERY

LifeSize UVC ClearSea was tested on the virtualisation solution VMware within LifeSize UVC Platform, the collective admin software of many server-side LifeSize applications. Alternatively, 19" stand-alone servers can be purchased. The maximum number of calling ports was restricted to 32 by the licence. The underlying virtual machine comprised a 4 vCPU with 9600 MHz, 6144 MB RAM, 100 GB memory and ran with a 64 bit Ubuntu Linux as guest system. Up to 10 vCPU are supported by LifeSize UVC ClearSea.

BANDWIDTHS

Bandwidth and resolution can be adjusted to a maximum of 2048 kbps or up to Full HD on the client side. Through the group of the user, restrictions can be implemented on the server side, i.e. the bandwidth can be restricted and certain resolutions can be forbidden. External H.323 and SIP devices can be called with up to 4096 kbps by the LifeSize UVC ClearSea.

The test report is divided in two parts (server, client), where the server part is more technical. If you are only interested in the functionality of the client, you can skip the passages discussing the server.
**INSTALLATION - SERVER**

When installing the server LifeSize UVC Platform is installed, which contains LifeSize UVC ClearSea. The instructions provided by LifeSize in the form of text and video are very useful and can be implemented step by step for your installation. The VMware image can be downloaded from the LifeSize website and can be inserted in the VMware vSphere Client as OVA file (OVF template). The minimum hardware requirements for the virtual machine specified by LifeSize should be taken into account. They are of course dependent on the number of calling ports. After switching on the virtual machine, the setup proceeds via the console of the VMware vSphere Client. The administrator login "administrator" is preset with the password "admin123". With the following command the network interface is created. The specification of the mtu (default 1500) was not optional in the test:

```
network set eth0 static <serverIPAddress> <subnetMask> <network> <broadcastIPAddress> <gatewayIPAddress> [mtu]
```

The subsequent setup of the server takes place in the web interface under the configured IP address. Important settings that should be set on the LifeSize UVC Platform are host name, DNS, routing, proxy, possibly a SSL certificate and any additional network interfaces. In the next step, an existing license is applied and LifeSize UVC ClearSea is enabled as an application on the LifeSize UVC Platform. You can assign up to two network interfaces for LAN/WAN and you should pay attention to the correct configuration of the default gateway and the static routes for the other network interface. At any existing firewall the ports specified by LifeSize in the web interface have to be activated for LifeSize UVC ClearSea. Additionally, an email address can be used for reporting. In that case, the corresponding SMTP server has to be specified.

**INSTALLATION - CLIENT**

The LifeSize UVC ClearSea client is available for 4 different operating systems. Microsoft Windows and Mac OS are for desktop use, Android and iOS for mobile use. The client software for the desktop can be downloaded after setting up the server using a web browser at the IP address or DNS name of the server (see screenshot on the right). For mobile devices the client software can be found in the respective app stores. The installation is self-explanatory, for the login a username and password provided by the server administrator and the IP address or DNS name of the server are needed. The data can be stored permanently in order to simplify later logins by checking "Sign me in automatically" (see screenshot top right).
The settings of the LifeSize UVC ClearSea server can be accessed via the web interface on the LifeSize UVC Platform, alternatively, they can be accessed after the activation of LifeSize UVC ClearSea as an application on the LifeSize UVC Platform using the IP address of LifeSize UVC ClearSea on port 8180 (http) or 8181 (https). The default administrator login is first used as login (see Installation - Server), but it should definitely be changed for security reasons.

Among the basic settings is the host name (domain name) which can be used to refer to the LifeSize UVC ClearSea server. Additionally, external H.323 and SIP calls should be activated as required and an appropriate bandwidth of up to 4096 kbps be chosen. Furthermore, encryption can be enabled or disabled globally for all users.

Furthermore, guest users can be admitted who can only connect to registered users with the help of the LifeSize UVC ClearSea client or guest invitations can be issued, which allows a guest user to call a specific registered user after having been invited. When using firewalls and NAT or an external web server, HTTP requests can be forwarded to an external URL. If a LifeSize MCU compatible with LifeSize UVC ClearSea is available, it can be integrated into LifeSize UVC ClearSea and thereby, running connections between two sides can be transferred to the MCU by means of so-called "call escalation" and other peers can be added to the connection.

So-called "call routings" are a very important option. They denote rules, which determine how the server should handle incoming connections. There are various settings and available tags, which are described very well in the LifeSize UVC ClearSea deployment guide. Thus, conditions can be specified, changes made to the call, caller and callee data and new destinations (forwarding, redirection, hanging up) can be defined. For safety reasons and error analysis call routings can be pretested in a sandbox environment. You should also pay attention to the maximum call duration set on the server for outgoing calls, which is by default set to 30 seconds. The call routings are especially important for the connection of the server to the GDS network, which also requires a configurable gatekeeper (see section Dial-Up).
DEVICE TYPES

The LifeSize UVC ClearSea server distinguishes between five different types of devices, including the registration type with the server:

- **LifeSize UVC ClearSea client**: This is the software client, which is available for Microsoft Windows, Mac OS (desktop clients), iOS and Android (mobile clients).
- **Devices that are associated with a LifeSize UVC ClearSea user**: For users, you can record additional devices on the server with one dial string each as so-called "associated devices". They are called as well when a call is executed, which means that the call arrives at several devices and can be answered from any of the devices.
- **Registered SIP device**: An SIP device, which uses the server as an SIP registrar. For the login, it uses the login data of a user registered on the server for this purpose.
- **Registered H.323 device**: A H.323 device, which uses the server as a gatekeeper with authentication. For the login, it uses the login data (H.323 ID = User ID, H.323 number = extension of the user) of a user registered on the server for this purpose.
- **Unregistered devices**: H.323 and SIP devices which do not fall in one of the aforementioned categories.

USERS, GROUPS

To manage users and/or groups an LDAP server can be registered for the entire LifeSize UVC Platform. It can be used jointly for the LifeSize UVC ClearSea. Of course, local users and groups are possible as well. The configured users and groups can be, for example, exported as a csv file for backup purposes and imported again. The accounts for the LifeSize UVC Platform are assigned separately from those for the LifeSize UVC ClearSea server. Here, the administrators of the LifeSize UVC ClearSea server must obtain an account for the LifeSize UVC Platform that is adequately equipped with rights, the accounts of the LifeSize UVC ClearSea server are provided only for the registration with clients and external H.323 and SIP devices.

Each user of the LifeSize UVC ClearSea server has a user ID, an extension, a complete display name and is associated with exactly one group. The user ID is a string that is used as login and can also be used for dial strings. The extension is a row of numbers, which can also be used in dial strings, but is also used in the Virtual Operator (see section Dial-Up). For each user, an email address must be recorded. Local passwords do not have to be assigned, but are mandatory when not using an LDAP server. In addition, temporary user accounts can be created or user accounts can be completely disabled. So-called "associated devices" can be assigned to a user (see section Device Types). The contact list and the history are stored on the server and can be viewed there.

Groups are used to determine settings for all of the users that are part of the group. You can enable or disable chatting between group members, the possibility of recording in the client and storing passwords locally. The most important settings relate to the contact list. All users of the server can be displayed or only users from specific groups. In addition, the test call can be removed from the contact list. Furthermore, contacts that are not displayed can be found with the help of the client's auto complete function. Information must be provided, which groups may be searched. Other important settings concern the codecs, resolutions and bandwidths, the ports that are to be used and the encryption settings which can be selected in the client. Apart from that, specific group contacts can be established and the banners in the clients can be customized. There is a default group, which cannot be deleted or disabled.
DIAL-UP

For each connection via the LifeSize UVC ClearSea server, 2 ports are required (incoming and outgoing connection), therefore twice the number of ports must be licensed.

Other registered users and registered devices can be called by the LifeSize UVC ClearSea client using the user ID or extension. The specification of the server via IP address or host name is optional. Non-registered devices can be reached by means of the prefixes "h323" (for H.323 calls) and "sip:" (for SIP calls). SIP calls are possible without further configuration. For H.323 calls, direct dialling of the IP address and URI dialling using the syntax "uri@IP address" also works immediately. For GDS calls, a so-called "call routing" must be set on the server. The settings of this routing are in detail:

- Condition: Dial string starts with 00
- Condition: Dial string is a number
- Action: Forward
- Destination: h323:<dialString>@"IP address GK"
- Enable caller transformation: H.323 aliases: E.164: "GDS number of the server":<callerExtension>

As "IP address GK", the IP address of a gatekeeper belonging to you has to be specified, which is registered in the GDS network. You should also verify that the option "AcceptUnregisteredCalls" is activated in the gatekeeper. It redirects all calls whose dial strings consist only of digits and start with 00 to the GDS network via the specified gatekeeper. The last line is optional and is only important when the LifeSize UVC ClearSea server can be reached via GDS number from the GDS network. In that case, the correct ring back number is displayed for the remote sides. The corresponding settings can be found further down in this section.

Non-registered devices can call the LifeSize UVC ClearSea server directly using the IP address or host name (H.323 or SIP). In the following, they see the welcome screen of the Virtual Operator (IVR), awaiting the entry of the extension of the user who is to be called via DTMF. Unfortunately, the data presentation could not be transmitted when using the Virtual Operators to establish a connection to Polycom Desktop. In addition, the syntax "User ID/extension@IP address/hostname of the server" is possible for direct SIP calls. A connection is established in conjunction with neither call alternative (IVR, directly) if it is a SIP call and the extension/user ID belongs to a registered H.323 device. URI dialling is also supported, the syntax depends on the device used. For GDS calls from unregistered devices to the LifeSize UVC ClearSea server, a separate gatekeeper and call routing is required, like in the opposite direction. For this purpose, the LifeSize UVC ClearSea server must be registered as a neighbour in the gatekeeper, exemplified here for the GnuGK:

[RasSrv::Neighbors]
clearsea="IP address of server":1719;0049123456

The rows of numbers are illustrative only: 0049123456 is the GDS number of the LifeSize UVC ClearSea server, 0049123 is the GDS number of your own gatekeeper. With this setting, the incoming calls on the gatekeeper that begin with 0049123456 are forwarded to the LifeSize UVC ClearSea server. In addition, the following settings are necessary as call routing:

- Condition: Dial string starts with 0049123456
- Condition: Dial string is a number
- Action: Forward
- Destination: <10dialString>

This rule cuts off the first 10 digits for incoming calls at the LifeSize UVC ClearSea server that begin with 0049123456. The remaining digits - the actual extension - stay intact.

Registered H.323 devices can use the call alternatives of the clients and the unregistered devices. SIP calls from the LifeSize UVC ClearSea server are always interpreted as user ID or extension at registered SIP devices, therefore only server internal SIP calls are possible. If the user ID or the extension is not recognized, the Virtual Operator is displayed.
In the test, 16 connections were carried out in parallel. More connections were not possible due to the license (32 calling ports). All connections were carried out to the DFN MCU to the very same conference room (see screenshot on the right). These 16 connections were established without problems, but due to the necessary protocol conversion from SIP (client) to H.323 (DFN MCU) a slight quality loss in the video was apparent. In the data presentation, there were more significant problems. The text was displayed partly blurred, there were colour errors on some slides and for several clients, a bandwidth of less than 50 kbps was transmitted for data presentation, resulting in long loading times for the slides.

It is possible to connect LifeSize UVC MultiPoint to LifeSize UVC ClearSea. After hereby eliminating the need for protocol conversion, no quality loss can be observed. However, you have to get used to the selected layout with its constantly changing positions every 5-10 seconds. On the server side, LifeSize UVC Multipoint requires considerably more resources.

The welcome email to newly created users contains 2 links which cannot be resolved by the LifeSize UVC ClearSea server.

Using the entry "h323:GDS number@IP address GK" as an associated device for a newly created user, guest users with external H.323 devices could connect via GDS by calling the newly created user. This functionality is not officially supported according to LifeSize and cannot be guaranteed for subsequent versions.

Under the menu item "Monitor", the status of registered users, current connections and displayed warnings can be observed in great detail. In addition, many log files are available and network traces as well as problem reports can be created for troubleshooting at LifeSize.
The interface of the desktop clients differs only slightly from the interface of LifeSize Softphone. Thus, getting started is not difficult for experienced users of LifeSize Softphone. But even without prior experience, the interface is fairly self-explanatory and straightforward and does not show any similarities with the predecessor Mirial ClearSea. Calls can be made via an input field, the displayed contacts and the history. The input field recognizes the user IDs, the extensions and the full names of registered users of the LifeSize UVC ClearSea server and can be used for external calls as well, if necessary (e.g. via IP addresses). In the history, all of the incoming and outgoing calls are logged. Furthermore a colour-coded status icon signals whether a contact is currently online or not available. The contact list is provided by the server and is dependent on the group setting of the logged in user.
During connections, a second window opens as video window. It can be displayed beforehand with the "Video" button. In the video window, the known functions are realised as overlay using symbols (see screenshot on the right). The microphone, sound and self-image can be enabled and disabled and different layouts can be selected to control the size of the self-image, of the other site and the data presentation. Furthermore, you can enter DTMF and remote-control the camera (via FECC). Ongoing calls may be recorded and archived. A large red bar displays the state of the recording process. The recordings can be exported to the Windows Media Video format (WMV) or, under Mac OS X, to the QuickTime format (MOV). Neither the option to select a layout, nor the recording option are available at the mobile clients.

The menu item for starting the data presentation is illogically hidden in the main window at the bottom right ("Share") and not placed in the video window. Additionally, the options for layout selection differ depending on whether a data presentation is received or sent. The statistics window can only be opened by keyboard entry of "s" in the video window, like in the previous version Mirial ClearSea. Unfortunately, nothing has changed about the layout and the minimal font size of the statistics window. What is more, the statistics are only available for the desktop clients.

**CONFIGURATION SETTINGS**

The configuration settings can be accessed by pressing the button "Settings" in the main window and are clearly arranged in various subitems.
In addition to the usual settings available for microphone, speakers and webcam, codecs and resolutions can be selected too. Furthermore, data presentations and the camera remote control can be disabled. The bandwidth can be set to up to 2048 kbps. The clients support encryption, which can be enabled or even set up as required. If the remote site does not support encryption, no connection will be established with the setting encryption required.

The selectable codecs, resolutions, bandwidths and encryption settings can be restricted on the server side by the server administrator and depend on the group membership of the logged in user.

**AUDIO / VIDEO**

All connections must pass through the LifeSize UVC ClearSea server, therefore the server might carry out a transcoding/protocol implementation. It is for example essential if an H.323 device is called, because the clients are connected to the server via SIP. In the test, the clients always negotiated the audio codec G.722.1C with the server. As audio codec between the server and the tested remote sites, G.722.1C or G.722.1 were predominantly negotiated. Only in connections to the Sony PCS XG80 nothing but the codec G.711 (= telephone quality) was used, which does not correspond to the current state of the art.

The audio quality was good to very good almost always in both directions. Only in the connection to the Sony PCS XG80, the audio quality was rated okay because of the codecs used and small audio dropouts. Short audio dropouts also occurred occasionally in the direct connection between the Windows and Mac client.

In contrast to the necessary transcoding between the negotiated audio codecs, video codecs and resolutions were sent unchanged by the server. Only the bandwidth was partially adjusted because the clients are limited to 2048 kbps, but external H.323 and SIP devices can connect to the server with 4096 kbps. H.264 was basically always used as codec, with one exception, the mobile iOS client (H.263+). In almost all of the tests HD resolution was negotiated, Full HD was achieved in sending direction with the Cisco C40 and receiving direction with LifeSize Softphone. Less than HD was only negotiated in connections to the Cisco EX90 in sending direction (624x352) and in connections to the mobile iOS client (CIF). The Cisco EX90 was registered directly with the server as an H.323 device. When using data presentations, the resolution or the frame rate was significantly reduced in most cases.

The video quality was very much dependent on the other party and the call direction. In many connections, good to very good video quality was achieved, but there also were connections with significant problems. The biggest problems occurred only when external H.323 devices established the call to ClearSea clients. Therefore, it is sensible for the clients to establish the call. In connection to the LifeSize Softphone, the image of the opposite site froze at LifeSize Softphone after a few seconds. In connection to the Cisco C40, long-lasting strong artefacts occurred in the entire video in the ClearSea client. There were also major problems in connection to the Cisco EX90 in the form of periodic image errors every 1-2 seconds.

In the connection of the Windows and Mac client the highest resolution (Full HD) had to be disabled in the clients, otherwise only a still image was transmitted by the Mac client. Apart from that, in some connections the quality of the video transmission decreased considerably with increasing moving parts.

**DATA PRESENTATION**

The transmission of slide shows according to the H.239 standard was carried out mostly in good and very good quality. The following observations refer to the reception of slide shows on LifeSize UVC ClearSea clients. In the connection of Windows and Mac client, periodic pixelation and then resharpening could be observed on some slides. In connection to the Sony PCS XG80 some slides were not fully sharp, in connections to the EX90 and to Polycom Desktop image errors were visible in the form of small coloured rectangles. In the connection to the Cisco C40 some slides were not transmitted. Additionally, the image of the other site disappears in connection to LifeSize Softphone on the side of LifeSize Softphone when receiving slide shows.

The image format used was mainly HD, in individual cases Full HD or other formats (1024x768, 1280x768) were transmitted. H.264 was always used as codec.
Concerning the transmission of moving images in the second video channel, the clients do not convince. Practical applicability in sending direction was given in only one case, at SD resolution. Better results could be observed in receiving direction, when external H.323 devices transmitted moving images in SD or HD resolution. Approximately half of all the tests produced practically applicable results at SD resolution, at HD resolution in approximately one third of all tests. A typical problem in the tests was a too low refresh rate. As a consequence, the moving images rather resembled a slide show. Additionally, some strong to extreme blocking artefacts occurred, partly there were also colour casts, white stripes and sudden speed changes.

Overall, areas for improvement in the area of data presentations can be identified, like in the case of its predecessor, Mirial ClearSea.

**SERVICE DFNVIDEOCONFERENCE**

The cooperation with the DFN MCU worked flawlessly, with one caveat. In the client, 1080p resolution must be disabled, otherwise the incoming video image of the MCU freezes at the client after a few seconds to minutes. If the MCU handles the call setup, this error does not occur. Consequently, in this call direction Full HD resolution was possible in receiving direction, in sending direction, it is still HD. Data presentations are transmitted in HD.

**FIREWALL**

The clients of LifeSize UVC ClearSea can establish connections across firewalls and potential NAT. It is important that the ports for the server specified by LifeSize are enabled for the respective network interfaces on the firewall.

**MISCELLANEOUS**

Encryption and remote camera control always worked in the test provided the technical prerequisites were met at the remote site.

It is possible to use the clients as a guest user without login. In this case however, you can only establish a connection to a registered user of the LifeSize UVC ClearSea server.

If a LifeSize MCU is available that is compatible with LifeSize UVC ClearSea and configured on the server, ongoing connections between two sides can be moved to the selected MCU and other peers can be added to the connection by means of so-called "call escalation".

When Polycom Desktop terminates the call, the LifeSize UVC ClearSea client crashes. In addition, the sound cannot be completely turned off in a connection at the mobile client for iOS. Sometimes the computers cannot cope with the requirements of the clients. They do not always recognize the clients reliably, which is why 100% CPU utilization in conjunction with colour errors (shades of green and grey) and sudden crashes can be the result. In that case, only manually selecting the permitted codecs and resolutions helps.

**CONCLUSION**

The integration of LifeSize UVC ClearSea in the LifeSize UVC Platform is very well done and includes many configuration options. However, the integration of the server in the GDS network is unnecessarily complex and not documented. The similarity of the clients to LifeSize Softphone is immediately apparent. The clients can be used well and are available for 4 platforms - Microsoft Windows, Mac OS (desktop) iOS and Android (mobile). The biggest problems in video transmission occurred when calls were initiated from external devices to the clients, so call setup in the opposite direction is preferable. Apart from that, the use of Full HD is partially still afflicted with errors and had to be turned off in some tests. Compared to the previous version Mirial ClearSea a lot has improved, particularly encryption of video conference calls was introduced. However, the need for improvement in the area of data presentations remains.
We thank Mr. T. Spiegl and Mr C. Ohsam of the company LifeSize (a department of Logitech) for facilitating the test.

Manufacturer: LifeSize (a department of Logitech)
Contact person: Mr. T. Spiegl

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