WOLFVISION®
Driving Knowledge Creation

Network Integration Guide: Cynap Videobar

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vSolution Cynap Videobar Network Integration

1. Basics

Before starting, check the existing infrastructure and define the required equipment and settings.
Various examples in this document show the different ways in which Cynap Videobar can be integrated into the network.
When connecting Cynap Videobar to LAN and WLAN at the same time, please use different IP ranges in order to prevent address conflicts.
The listed IP addresses are only examples.
Cynap Videobar can be treated as a standard network device and it is as secure as the supporting network. Cynap Videobar cannot be considered as a router, switch or firewall. Communication to other networks and access must to be controlled using your existing equipment (firewall, router, switch and so on).
By default, the built-in access point is enabled, SSID and password are the serial number of the unit (inclusive leading zero, e.g. 0106406).

2. Glossary

This glossary will assist you in setting up the network correctly. Please note that in order to connect Cynap Videobar to an existing company network, some information from the local administrator is required.

2.1. LAN / Ethernet settings

Priority Interface Access	The higher prioritized interface (value = 1) will be used for network services first. Ensure that the value is different from the WLAN interface priority.
DHCP	Cynap Videobar will get all network settings automatically from the DHCP server in the existing network. Switch it to OFF to set the static addresses manually.
IP address	Unique address in the network, i.e. 192.168.0.100. The IP address of Cynap Videobar can for example be set to 192.168.0.1.
Subnet mask	Available IP addresses can be limited. A commonly used subnet mask would be 255.255.255.0
Gateway	Defines the IP address of the server / connection to other networks (such as the internet). When Cynap Videobar is directly connected only to a PC, then enter the IP address of the PC.
Name server 1 / 2	Input the IP address of the preferred Domain Name System (DNS). This Server translates domain names into corresponding IP addresses.
Identity	Login credentials to connect Cynap Videobar in a protected network. (IEEE 802.1x).
Anonymous Identity	The identity to be used on an unencrypted session before Identity is being validated on an encrypted session.
Authentication	Allow authentication according to IEEE 802.1X. Enter valid login data to connect.
Authentication Method	Supported are PEAP with MSCHAPv2 and TTLS-PAP
Root Certificate	Only root certificates are supported, load the certificate by using the Web Interface through the WLAN interface. Allowed certificates: • root certificate (CA) with common file extension .crt

	Base-64-coded X.509 encoded DER certificate • Privacy Enhanced Mail with common file extension .perm Base-64-coded X.509 encoded DER certificate certificate stored between 2 tags: “---Begin Certificate---“and” ------End Certificate-----“

2.2. WLAN settings – access point

Mode OFF	Disable access point.
Mode Access Point	Enable access point.
Region	Select the region where Cynap will be operated (US-region or others).
Channel	Defines the channel used for wireless communication. For optimum performance, select a currently unused channel.
Enable Routing	Enabled Routing allows HTTP / HTTPS traffic of your third party device through the LAN interface of Cynap Videobar. Gateway and first Nameserver of the LAN interface will be used.  **WARNING** Enabling Internet Routing could be a security risk! Protect your data from unauthorized access.
IP address	Defines the IP address of the access point. Cynap Videobar acts as a DHCP server and provides the necessary network settings to the connected devices.
Subnet mask	Available IP addresses can be limited. A commonly used subnet mask would be 255.255.255.0
Maximum Number of clients	For security reasons, the number of support clients can be reduced (max. supported 8).

2.3. WLAN settings – infrastructure (Cynap Videobar acts as client)

Use the access point list to check the currently available access point and its signal strength.

Mode OFF	Disable Infrastructure
Mode Infrastructure	Enable Infrastructure, Cynap Videobar can be connected as client to an existing access point.
Band	By default, Cynap Videobar uses the 2.4GHz and 5 GHz frequency band. The frequency band used can be limited to either 2.4GHz or 5 GHz. This setting is not available in BSSID mode.
Priority Interface Access	The higher prioritized interface (value = 1) will be used for network services first. Ensure that the value is different from the LAN interface priority.
BSSID On / Off	Use the button to toggle between SSID and BSSID mode. With BSSID (Basic Service Set Identification), the used access point will be fixed and Cynap Videobar will connect to the defined access point only. Access point hopping, which is available in SSID mode (Service Set Identification), will be prevented.
SSID	Defines the network name in plain text for easy identification of the WLAN network. Check existing WLAN infrastructure to get SSID. Following characters are supported: - AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz - 0123456789 - _-:$& ()
BSSID	Defines the network name in plain text for easy identification of the WLAN network. Check existing WLAN infrastructure to get SSID. This setting is available in SSID mode only.
Subnet mask	Available IP addresses can be limited. A commonly used subnet mask would be 255.255.255.0
Gateway IP	Defines the IP address of the server / connection to other networks (such as the internet). When Cynap Videobar is directly connected only to a PC, then enter the IP address of the PC.
Name server 1 / 2	Input the IP address of the preferred Domain Name System (DNS). This Server translates domain names into corresponding IP addresses.
Encryption	Defines encryption for safe network traffic. All connected units must use the same algorithm (None, WEP, WPA2, WPA2 Enterprise). WEP allows passwords with length of 13 characters (128 bit WEP). WPA2 allows passwords with a length of 8 ~ 63 characters. Use special characters carefully, not every third party can handle it. When using WPA2 Enterprise, load the certificate by using the Web Interface through the LAN interface.
Identity	Login credentials to connect Cynap Videobar in a WPA Enterprise protected network.

Anonymous Identity	The identity to be used on an unencrypted session before Identity is being validated on an encrypted session.
Authentication Method	Supported are PEAP with MSCHAPv2 and TTLS-PAP
Root Certificate	Only root certificates are supported, load the certificate by using the Web Interface through the LAN interface. Allowed certificates: • root certificate (CA) with common file extension .crt Base-64-coded X.509 encoded DER certificate • Privacy Enhanced Mail with common file extension .perm Base-64-coded X.509 encoded DER certificate certificate stored between 2 tags: “---Begin Certificate---“and” ---End Certificate-----“
Signal Level Limit (dBm)	Defines when Cynap Videobar start to search for another access point with the same SSID in your infrastructure (WLAN roaming). Monitoring the current signal level to prevent too low values. Lookups could interrupt the network connection shortly and every lookup will be counted (Reconnect Counter (Low Signal Level).
Signal Level	Shows the current strength of the WLAN signal in dBm.
Reconnect Counter (Connection Loss)	Counts every connection loss, e.g. when the selected access point would be powered down.
Reconnect Counter (Low Signal Level)	Counts every lookup then the measured signal falls below the user defined signal level limit.

2.4. Date and time (General Settings)

Time source	Cynap Videobar has a built-in battery-buffered RTC clock (Real Time Clock). Settings will only be lost if the battery is empty. To eliminate the risk of incorrect time stamps, Cynap Videobar can be synchronized to an external time server. Select external and input a valid IP address or URL of a NTP time server.

2.5. Host name (General Settings)

Host name	The Host name can be changed in the settings under general settings. The host name can be useful for network administrators to see the device name in plain text in the list of clients. Please note, this host name is not automatically listed in the DNS list, and therefore cannot be used in a browser without DNS registration.

2.6. LAN / WLAN port

The LAN port enables integration of Cynap Videobar into an internal network. Administrators of a large number of Cynap Videobar systems can use the LAN port to control, support and update all of their units from their local desktop PC.

The list of applications for the Cynap Videobar LAN port is constantly increasing. It can be used for controlling, capturing still images, viewing live video streams, firmware updates, adjustments, menu settings and for maintenance purposes. Some features are only supported when using vSolution Link software.

The following protocols are supported: TCP/IP, IGMP, RTP, RTSP, UDP and ARP.
Supported (tested) internet browsers are: Microsoft Edge, Firefox, Chrome, and Safari.
By default, DHCP is activated to receive all network settings automatically from the DHCP server.

Hint - WLAN:
To ensure optimal performance of supplied remote control (optional), prevent channel 13 in the band of 2.4 GHz. Switch Cynap Videobar to standby closes all connections.

2.7. Proxy settings

To increase security level, use a proxy server to control HTTP and HTTPS traffic from Cynap Videobar. Built-in access point and other local services are not controlled. To take effect the new settings, Cynap Videobar will reboot automatically.

Proxy enable	Enable or disable proxy functionality to control HTTP and HTTPS traffic (other services and built-in access point are not controlled). Please note, using a Proxy server may block vSolution Link Pro functionality.
URL	URL of the proxy server in your network, like 104.236.10.17 (or DNS name up to 256 characters, no space between the characters). DNS server not required, when using IP addresses.
Host Port	Port, set the used network port to connect to your proxy server.
Authentication	Allows authentication with username and password.
Username	Input the username according to your proxy server settings.
Password	Input the password according to your proxy server settings.

2.8. Security

Admin password
Defines the necessary password for administrator access. This login data is needed to change the Ethernet Mode, and an existing administrator password. Using the login data, an administrator can connect to Cynap Videobar at any time. The default password is “Password”. Remember to make a note of any changed passwords!

Login Security
Accessing Cynap Videobar can be protected by authentication (admin, moderator, PIN or LDAP user).
To prevent unauthorized access to the settings, the credentials needs to be entered whenever you start a new session or when logged out previously.

Network Security
Accessing Cynap Videobar can be limited to secure connections only (https). Please note, the accessing application needs to support SSL / TLS (e.g. the most modern browsers are supporting HTML5 and SSL /TLS).
Wolfvision support access can be prohibited by disabling SSH.

LAN Security
When using wired network, use authentication (IEEE 802.1x) to maximize security.
When using certificates, load it busy using the Web Interface.

WLAN (WiFi) Security
When using wireless network, use encryption to maximize security.
Cynap Videobar complies with following standards:

- WEP
- WPA2
- WPA2 Enterprise (IEEE 802.1x)

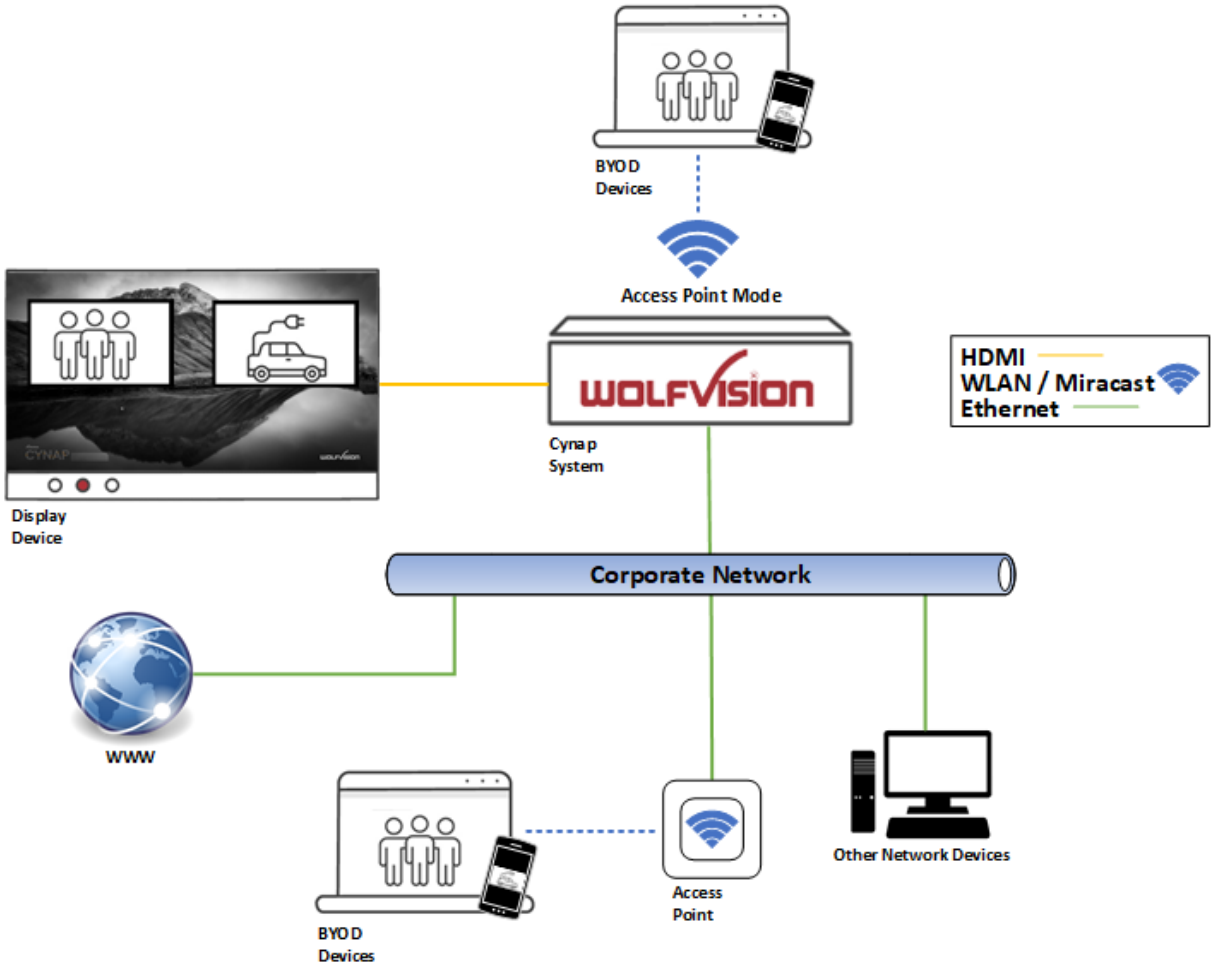
Hint
WEP allows passwords with a length of 13 characters (128 bit).
WPA2 allows passwords with a length of 8 ~ 63 characters.
Use special characters carefully, not every third party device can handle them.
When using WPA2 Enterprise, load the certificate by using the Web Interface.
When using the built-in access point, the security settings will be handled automatically.
When starting a new presentation, the SSID and also the password will be changed.

3. Network integration (examples)

The following examples are showing different ways to integrate Cynap Videobar into your network infrastructure, one network and one wireless network.
BYOD (bring your own device) allows sharing the screen content of different devices with various operating systems to Cynap Videobar to share to a big display device.

3.1. Cynap Videobar wireless network access point mode

Cynap Videobar integrated via a cable connection into an existing network, and operates in wireless network access point mode additionally. LAN settings for Cynap Videobar can be obtained from an existing DHCP server. Cynap Videobar generates an independent WLAN, and WLAN enabled (BYOD) can connect to Cynap Videobar.



Advantages:

- All devices can communicate with each other
- Cynap Videobar has access to the internet.
- Cynap Videobar can access the internet to check for firmware updates without using additional devices
- Security issues – BYOD devices over the access point have no access to the existing network and internet.

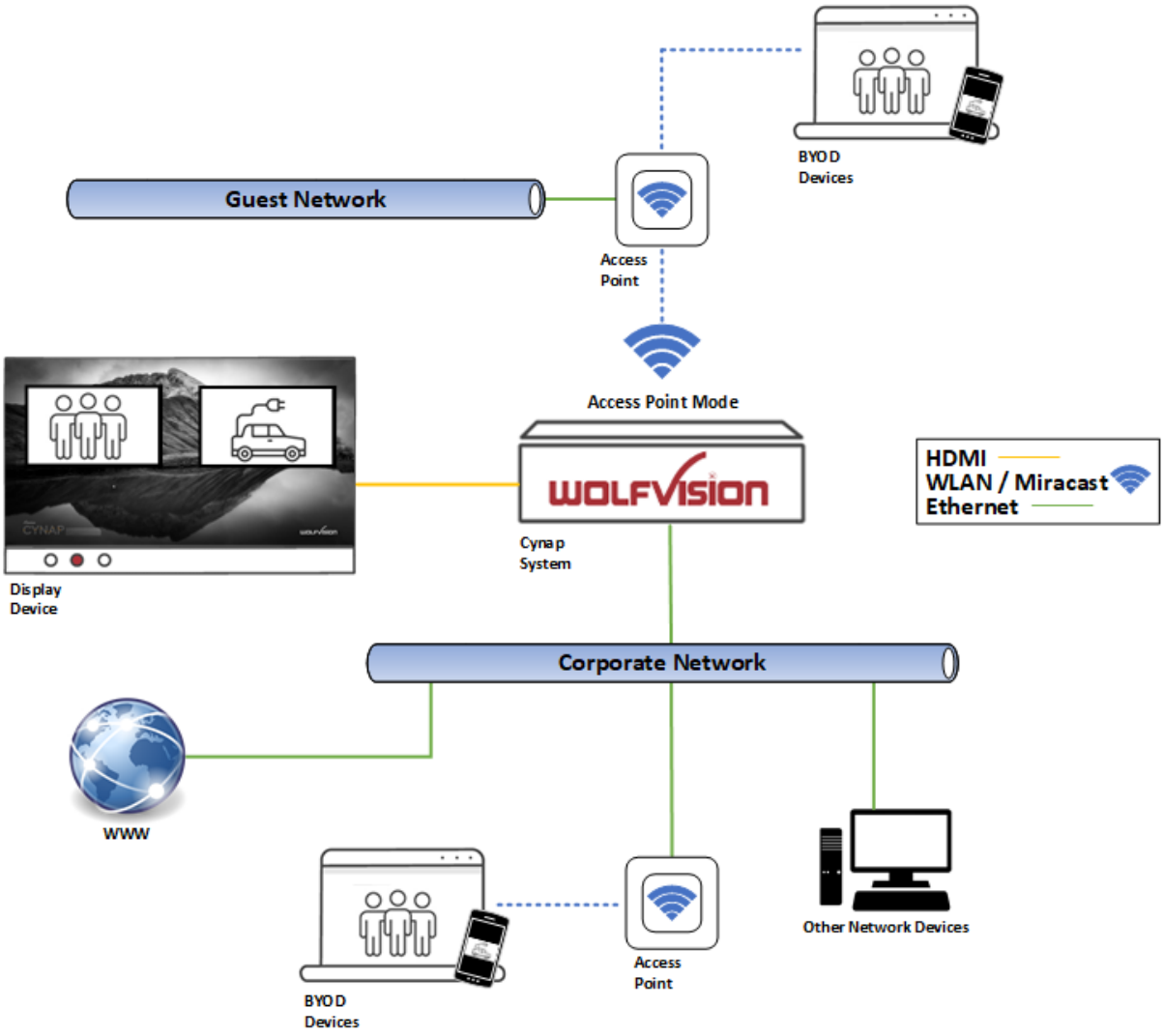
Disadvantages:

- Performance issues (all traffic is on the same network)

Hint:
If the units are in different subnets, Cynap Videobar might not be able to be discovered automatically by vSolution applications.

3.2. Cynap Videobar network infrastructure mode

Cynap Videobar is integrated to an existing wired network (e.g. Corporate network) wired, and additionally connected to a wireless network (e.g. Guest network as separate VLAN). LAN and WLAN settings for Cynap Videobar can be obtained from an existing DHCP server. All devices of the Corporate and also the Guest network can be connected to Cynap Videobar.



Advantages:

- All devices can communicate with each other
- Cynap Videobar has access to the internet.
- Cynap Videobar can be moved within the range of the access point
- Cynap Videobar can access the internet to check for firmware updates without using additional devices

Disadvantage:

- Performance issues (all traffic is on the same network)

Hint:

If the units are in different subnets, Cynap Videobar might not be able to be discovered automatically by vSolution applications. Cynap Videobar can also be installed in a VLAN.

4. Firewall rules

Cynap Videobar has firewall rules that must be adhered to in order to allow successful network communications, and the corresponding services to be used. To use services with user defined addresses and ports, be sure these are not blocked by your firewall.

Function / Application	Port	Type	Inbound / Outbound	Description
Airplay				
Multicast DNS (mDNS)	5353	UDP	Inbound / Outbound	Multicast DNS (mDNS 224.0.0.251) Bonjour
Audio	4100 – 4164	TCP / UDP	Inbound	Audio for Airplay
Airplay	7000	TCP	Inbound	Primary Airplay communication
Video	7100	TCP	Inbound	Airplay video communication
Audio	47000	TCP	Inbound	Airplay audio communication
Airplay Bluetooth				
Audio	4100 – 4164	TCP / UDP	Inbound	Audio for Airplay
AirPlay	5000	TCP	Inbound	AirPlay communication with legacy devices
Airplay	7000	TCP	Inbound	Primary Airplay communication
Video	7100	TCP	Inbound	Airplay video communication
Audio	47000	TCP	Inbound	Airplay audio communication
Chromecast				
Multicast DNS (mDNS)	5353	UDP	Inbound / Outbound	Multicast DNS (mDNS 224.0.0.251)
Discovery	1900	UDP	Inbound	Chromecast discovery
Audio	4100 – 4164	TCP / UDP	Inbound	Audio for Chromecast
Chromecast	8008	TCP	Inbound	Primary Chromecast communication
Chromecast	8009	TCP	Inbound	Communication Chromecast
Video data stream	32768 – 61000	UDP	Inbound /Outbound	Chromecast (video data stream)
Miracast MS-MICE				
Multicast DNS (mDNS)	5353	UDP	Inbound	Multicast DNS (mDNS 224.0.0.251)
DHCP	67 / 68	UDP	Inbound	DHCP communication between device and receiver
RTP Stream	19000 – 19007 19010 – 19017	UDP	Inbound	RTP media traffic port for delivering audio and video
RTSP Control	7236	TCP	Outbound	RTSP control port is used to establish and manage session
MS-MICE Control	7250	TCP	Inbound / Outbound	Control port on which Cynap family system listen for Miracast packets when over existing network mode is enabled
Touchback	50000	TCP	Outbound	This port is for touchback to send mouse events back between Cynap to the Windows computer. If this port is blocked, bi-directional inputs is not possible.
Hardware cursor extension	19020 – 19027 19030 – 19037	UDP	Inbound	Hardware cursor to reduce latency when using touchback.

Wake On LAN	7 / 9	UDP	Inbound / Outbound	Usually port 7 is used for sending the magic packet
FTP	21	TCP	Outbound	Connection to FTP server
SSH	22	TCP	Inbound	Access for Wolfvision support
http, Cynap control	80	TCP	Inbound	This port used to connect to Cynap web interface (httpd). If this port is blocked, no connection can be made.
https, SSL, e.g. Cloud Service, Cynap control	443	TCP / UDP	Inbound	This port is used to cloud service and for secure connect to Cynap web for secure connect to Cynap web interface. If this port is blocked, no connection can be made.
Proxy	8080	TCP / UDP	Outbound	Default port proxy function (This port can be changed in the Proxy settings).
NTP	123	UDP	Outbound	For optional clock synchronization by a time server (Network Time Protocol, NTP)
LDAP	389	TCP / UDP	Outbound	Connection to LDAP server
LDAPS	636	TCP / UDP	Outbound	Connection to LDAPS server (TLS)
PJLink	4352	TCP	Outbound	This is the default port for PJLink and cab be changed in the settings (Peripheral Control)
vSolution Cast				
Discovery Multicast	50000	UDP	Inbound	This port is used for device discovery all available Cynap and Visualizer in the network by vSolution applications (uses Multicast IP address 239.255.255.250). If this port is blocked, vSolution applications may not be able to find devices automatically.
Device Discovery	50913	UDP	Inbound	This port is used for device discovery
For control purposes	50915	TCP	Inbound	This port is used for control purposes e.g. room control system, and others). If this port is blocked, no control is possible
TLS Control	50917	TCP	Inbound	This port is for secure communication between WolfVision applications (e.g. vSolution App) to Cynap and / or Visualizer. If this port is blocked, secure communication to Cynap and / or Visualizer, inclusive firmware updates are blocked.
Video streams	50921	TCP	Inbound	Video streams between Wolfvision App to Cynap and Visualizer. If this port is blocked, no stream are possible.
Touchback	50922	TCP	Outbound	This port is for touchback between Cynap and Wolfvision App vSolution Cast to send mouse

				events back to the Windows computer. If this port is blocked, bi-directional inputs is not possible
vSolution App iOS / Android / Windows				
Discovery Multicast	50000	UDP	Inbound	This port is used for device discovery all available Cynap and Visualizer in the network by vSolution applications (uses Multicast IP address 239.255.255.250). If this port is blocked, vSolution applications may not be able to find devices automatically.
http, Cynap control	80	TCP	Inbound	This port is used to connect to the Cynap web interface (httpd). If this port is blocked, no connection can be made.
https, SSL, e.g. Cloud Service, Cynap control	443	TCP	Inbound	This port is used to cloud services and for secure connect to the Cynap web for secure connect to the Cynap web interface. If this port is blocked, no connection can be made.
Device Discovery	50913	UDP	Inbound	This port is used for device discovery.
For control purposes	50915	UDP	Inbound	This port is used for device discovery.
TLS Control	50917	TCP	Inbound	This port is for secure communication between WolfVision applications (e.g. vSolution App) to Cynap and / or Visualizer. If this port is blocked, secure communication to Cynap and / or Visualizer, inclusive firmware updates are blocked
TLS Control	50917	TCP	Inbound	This port is for secure communication between Wolfvision application (e.g. vSoltuion Link) t Cynap and / or Visualizer. If this port is blocked, secure communication to Cynap and / or Visualizer, inclusive firmware updates are blocked.
WebSocket	7681	TCP	Inbound	User interface communication with Cynap (via browser)
WebSocket	7682	TCP	Inbound	User interface communication with Cynap (via fully integrated Visualizer)
vSolution Link Pro				
Wake On LAN	7 / 9	UDP	Inbound / Outbound	Wake On LAN – Usually port 7 is used for sending the magic packet
DNS	53	TCP / UDP	Inbound / Outbound	DNS – This port will be used for Domain Name System. If this port is blocked, DNS service are not available

http, Cynap control	80	TCP	Inbound	This is the default port to connect to the web interface (httpd) of vSolution Link Pro. Of this port is blocked, connection cannot be established
https, SSL, e.g. Cloud Service, Cynap control	443	TCP	Inbound	This is the default port to connect to web interface (https) of vSolution Link Pro. If this port is blocked, connection cannot be established.
SMTP	587	SMTP	Outbound	Mail Server – Port for communication with SMTP server.
Discovery Multicast	50000	UDP	Inbound	This port is used for device discovery all available Cynap and Visualizer in the network by vSolution applications (uses Multicast IP address 239.255.255.250). If this port is blocked, device discovery is not possible
Device Discovery	50913	UDP	Inbound	This port is used for device discovery. If this port is blocked, device discovery is not possible.
For control purposes	50915	TCP	Inbound	This port is used for control purposes. If this port is blocked, no control is possible

5. Differences in Open Mode / Protected Mode

When using Cynap Videobar, it is possible to choose between either Open or Protected Mode in Cynap settings.

Modes:

Open Mode
The open is intended for quick and easy connections and BYOD without the need of high security and big effort for administration.
When Open Mode is active, all available devices can connect to Cynap Videobar.
Additionally, a user password cab be set.
In the Open Mode, Airplay, Miracast and / or vSolution Cast PIN can be used to prevent disturbance of external devices. The PIN will be shown on the connected display only (HDMI).

Protected Mode
This mode allows desired mirroring sessions only, to prevent misuse and disturbances.
The moderator has to enable a coming session in front by using the room management system. (The room management system needs be correctly implemented)

Mirror Settings
To change the security behaviour to grant or deny connection requests.
To select which kind of mirroring systems could be connected. Disabled systems couldn't share their content.
Possible settings are:

- Mode:
  Open Mode, everybody can connect.
  Protected Mode, every connection or mirroring must be be authorized in the Source toolbar of the main screen, or by using the room management system.
- Miracast for Android devices
- AirPlay for iOS devices
- Chromecast for Google Chrome
- vSolution Cast

6. BYOD

Cynap Videobar is designed to make it as easy as possible for users to connect to it. Cynap Videobar supports integrated mirroring protocols in its operating system. Users can connect to Cynap Videobar without needing any additional software. The mobile platforms are AirPlay for iOS devices and Miracast for Android and Windows devices. Regarding laptop and computer operating systems, AirPlay is also supported for Mac OS X. Windows Intel Wireless Display is also supported, and this integrates natively with Windows 8.1.

AirPlay	Support for iOS 5.0 (released 2011) and above, or OS X 10.8 Mountain Lion (released 2012) and above. AirPlay is transmitted via Ethernet / WLAN. It can be used for displaying up to four sources.
Miracast	Miracast is based on a Wi-Fi direct connection. This means that Miracast can only be used in close proximity to Cynap Videobar. Any used cabinet will reduce the possible transmission radius. High WLAN traffic in your environment may reduce the possible radius, increase the delay of picture transfer or results in reduced image quality (MICE support could help to increase the radius, the discovery beacon will be always sent by the dedicated built-in WLAN module. For more information, please refer to the manual.
vSolution App	The vSolution App allows controlling your Cynap Videobar. Using our vSolution App for Android, iOS, macOS, or Windows, with a Cynap system, enables students or work colleagues to receive shared content and to control the unit. On Android, iOS and macOS, you can register your Cynap Videobar manually when discovering services are blocked in your network (Bonjour, mDNS).
vSolution Cast (Windows)	In applications where a Wi-Fi direct connection is not possible due to the installation, multiple Windows devices can be connected at the same time using the alternative vSolution Cast.
Chromecast Screen Mirroring	Support for Chromecast capable devices. Chromecast is transmitted via Ethernet / WLAN. It can be used for displaying up to four sources.

AirPlay, Chromecast, Miracast and vSolution Cast are based on device discovery technologies for maximum ease of use. Therefore it is necessary that the appropriate services (See Firewall rules) are available. Alternatively, when using vSolution Cast, a Cynap Videobar IP address can be entered manually. On Windows systems, vSolution Cast can either be run temporarily by users, or permanently installed (copied). The application can also be used from a USB stick without needing administrator rights, however with the restriction that no sound is transmitted.
Switching Cynap Videobar to standby closes all connections.

7. User interface

Cynap Videobar can be controlled using any current standard browser. The user interface has been developed using the latest web programming standards, and this means that there is no need for additional add-ons or plugins such the Java Platform, in order to have full control of Cynap Videobar. HTML5 technology only requires a browser that can handle JavaScript and WebSockets, and this has been state-of-the-art for the last few years.
You can also adjust the settings using the remote control (optional). The remote control uses the 2.4 GHz band. The remote control has a built-in gyro sensor and can be used as a digital laser pointer.
Cynap Videobar can also be used in combination with room management systems. Communication is possible via the Wolfprot protocol. More information about this protocol can be found in the support section of our website www.wolfvision.com .
The vSolution App allows smartphones / tablets (iOS, Windows, Android) to control Cynap Videobar directly via WLAN. More information about the vSolution App can be found on in the support section of our website www.wolfvision.com .

8. Hardware and OS

Cynap Videobar uses a Linux operating system. The distribution is a WolfVision specific variant, which in addition to the Linux kernel contains only the individual libraries and packages required for the functionality of Cynap Videobar. This operating system is efficient, secure and lean. The operating system is installed after the installation process, and every update is installed to a read-only partition that cannot be changed after the installation process. This feature and the strict separation of system and user data, such as pictures, videos etc. ensures a very high level of system security. The system structure is protected against any external access, and it does not require additional security programs (antivirus, firewall, etc.). The Cynap Videobar system includes all viewer and software packages, and no additional licenses are required.

The current hardware specifications, connectors, delivery, and technical specifications can be found on our website www.wolfvision.com.

9. Administration

Cynap Videobar can be managed using the vSolution Link Pro software.
With vSolution Link Pro software, administration tasks, like firmware updates, can be performed for multiple Cynap systems simultaneously. With this tool, you can also determine the state of you Cynap Videobar system and sending a Wake-on-LAN (WoL) command. You can create, manage and distribute a settings profile to all Cynap systems using vSolution Link Pro software, and you can change the background wallpaper easily.

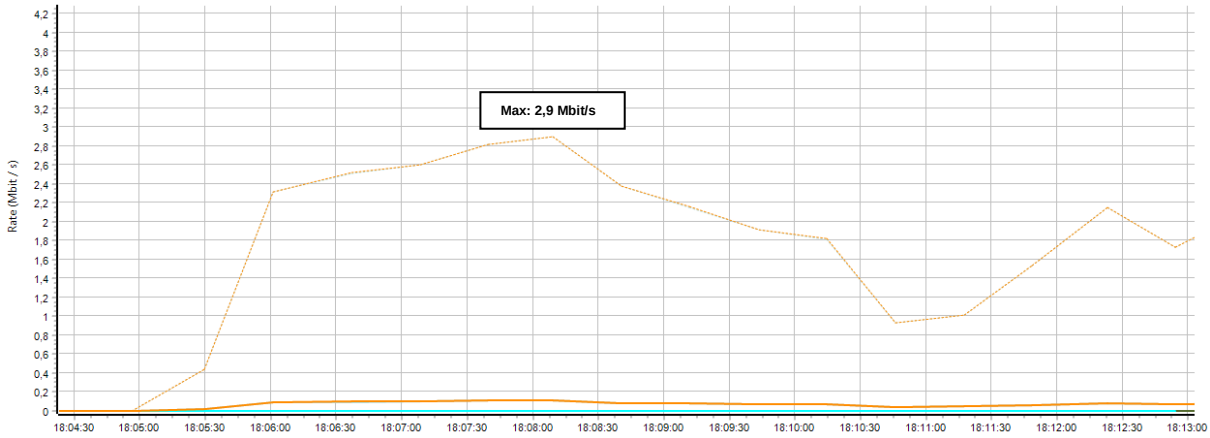
More information about vSolution Link Pro software can be found in the support section of our website www.wolfvision.com.

10. Bandwidth Measurement Data

This bandwidth measurement data has been taken using a notebook PC with a Windows operating system. The computer was connected to Cynap Videobar via WLAN, and was operating in network infrastructure mode.

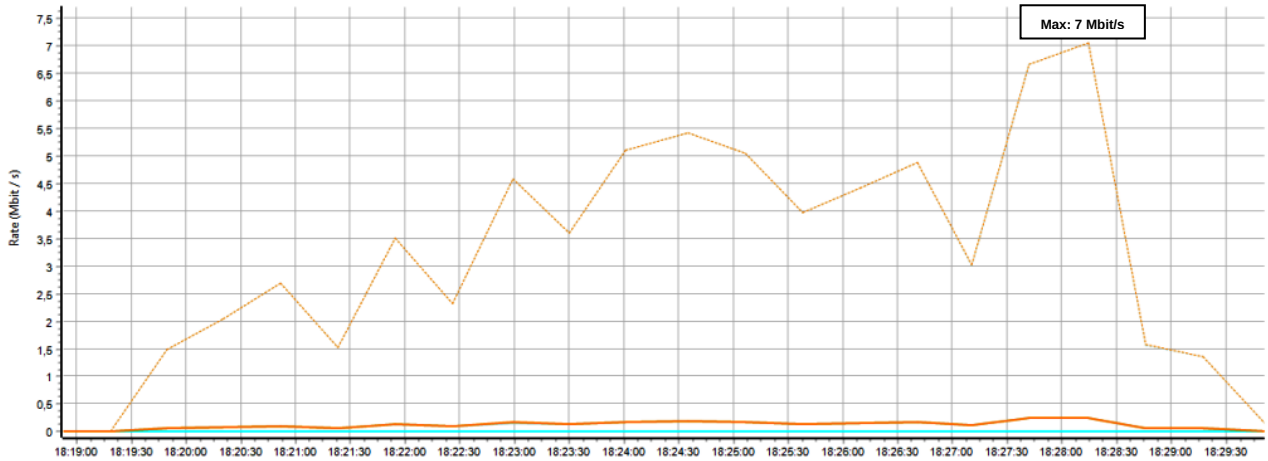
10.1. PowerPoint Presentation

Presentation with text and a few graphics are displayed from the notebook and are mirrored to Cynap Videobar using vSolution Cast Software to a single connected client. (Traffic Out)



10.2. Multimedia from Notebook to Cynap Videobar using vCast Software

1080p video (Big Buck Bunny) is displayed on the notebook and is mirrored using the vSolution Cast Software to a single connected client. (Traffic Out)



11. Client System Requirements

Requirement Airplay Mirroring OS X Mountain Lion v10.8 (Release 2012) or later:

Product	Version
iMac	Mid 2011 or later
Mac mini	Mid 2011 or later
MacBook Air	Mid 2011 or later
MacBook Pro	Early 2011 or later
Mac Pro	Late 2013 or later

Requirement Airplay Mirroring iOS 5.0 (Release 2011) or later:

Product	Version
iPhone	4 or later
iPad	2 or later
iPad	mini or later
iPod touch	5th generation or later

Requirement Miracast:

Product	Version
Android	4.4.2 or later
Microsoft Windows	8.1, 10, 11 Hardware with Miracast support required
Windows Phone	8.1, 10
Blackberry	10.2.1 or later

Requirement Chromecast:

Product	Version
Android	4.0.3 or later (Chromecast required)
Microsoft Windows	7, 8.1, 10 (Chromecast Browser Plugin required)

12. Index

Version	Date	Changes
1.0	19.02.2024	Created