Live Expert Networking Admin Guide

Release 7.7.0

ClairVista, LLC

June 08, 2015

CHAPTER

ONE

ADMIN GUIDE OVERVIEW

Real time voice and video applications rely on network performance to achieve high quality experiences for their users. The Live Expert Networking Guide provides an overview of the requirements needed to operate its video chat and content sharing features as well as recommendations for various video settings, bandwidth to support preferred video quality, overviews of application processes and more.

1.1 Live Expert System

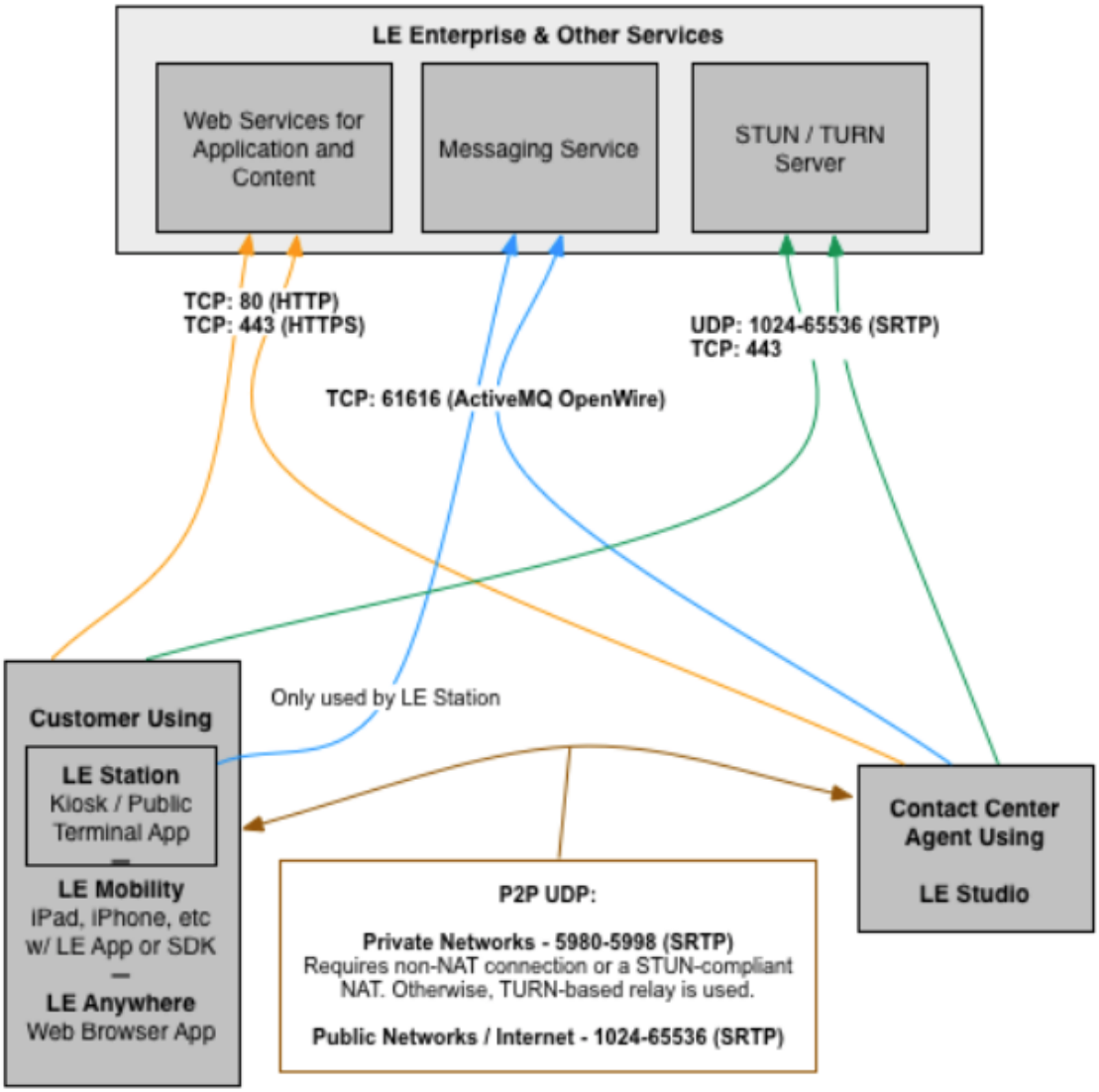
The Live Expert system consists of a set of endpoints used by contact center agents, endpoints used by customers and servers to connect the endpoints and operate the service

Contact Center Endpoint	LE Studio	A Windows desktop application used by contact center agents.
Customer Endpoints	LE Station	A Windows desktop application running on a kiosk or public terminal.
	LE Mobilty	iOS SDK & Apps that bring Live Expert functionality to iOS.
	LE Anywhere	Browser-based Live Expert app.
Servers	LE Enterprise	The principal server application in the Live Expert suite; home to the system's business logic, telephone signaling, master data management, analytics, settings, etc.
	LE Messaging	The LE Endpoints and Servers rely on bidirectional messaging.
	STUN	Enables each endpoint to discover the type of NAT it resides behind.
	TURN	Serves as a relay in those cases where the endpoints are prevented from connecting to one another via peer to peer.
	Adobe Media Server	Live Expert's default web browser calling technology is WebRTC, but not all browsers are enabled. For those cases where customers are using browser without WebRTC capability, Live Expert detects the condition and employs the Adobe Flash peer to peer media system.
	Cobrowsing	In the case where Cobrowsing is used, a separate server is required to keep customer and agent session synced.
	Omaha	Live Expert's endpoint software update service, based upon Google's Omaha software updating platform.
	Static Assets	Live Expert serves static content and media via cookies HTTP services.
	LE Recorder	A storage server for call recordings.
	Raygun.io	Endpoint error logging and reporting service.

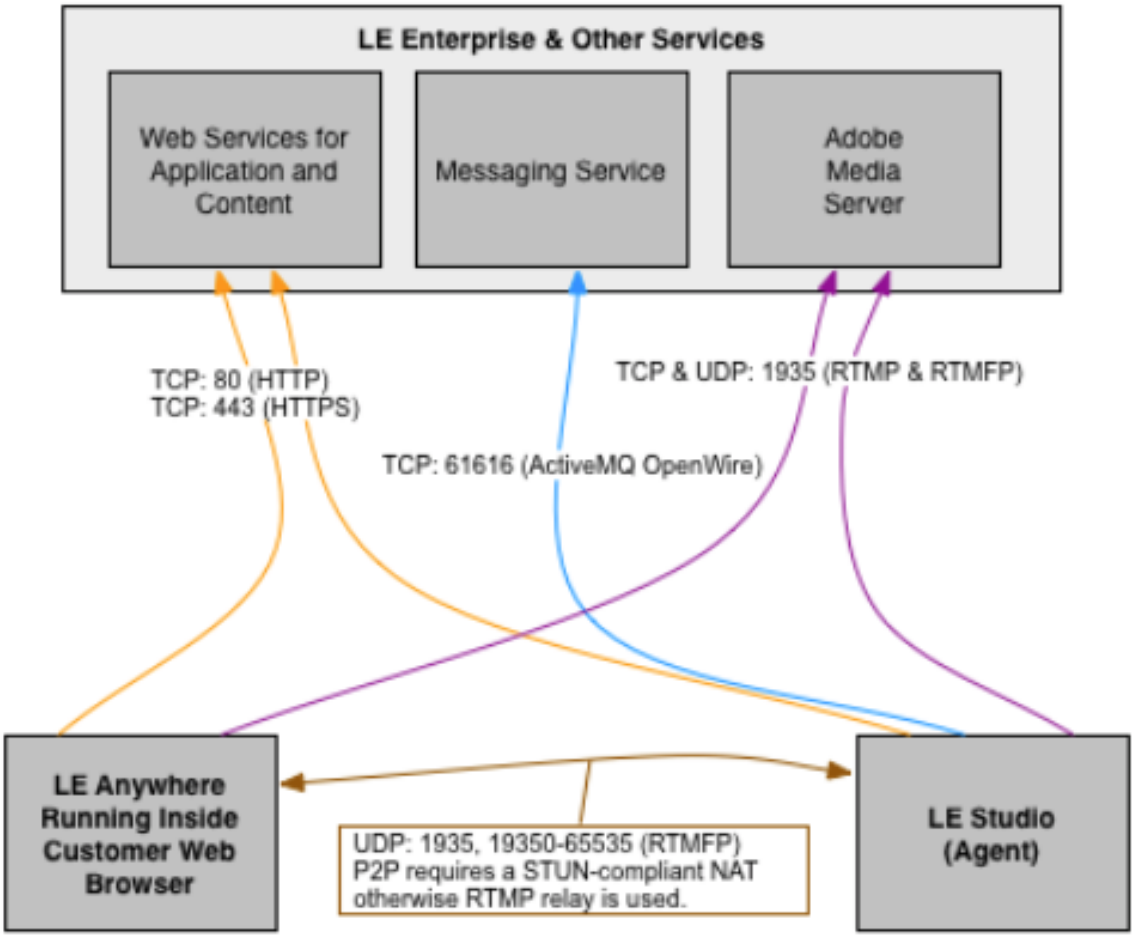
1.2 Live Expert Calling Session Data Flow

1.2.1 LE Station, Mobility, & Anywhere - WebRTC Sessions

The following context diagrams show the IP protocols, ports and data flow among the various Live Expert endpoints and servers for an in-call state. These diagrams do not necessarily include static assets, software update servers, etc.


LE Enterprise & Other Services
Web Services for Application and Content
Messaging Service
STUN / TURN Server
TCP: 80 (HTTP)
TCP: 443 (HTTPS)
TCP: 61616 (ActiveMQ OpenWire)
UDP: 1024-65536 (SRTP)
TCP: 443
Only used by LE Station
Customer Using
LE Station
Kiosk / Public Terminal App
LE Mobility
iPad, iPhone, etc w/ LE App or SDK
LE Anywhere
Web Browser App
P2P UDP:
Private Networks - 5980-5998 (SRTP)
Requires non-NAT connection or a STUN-compliant NAT. Otherwise, TURN-based relay is used.
Public Networks / Internet - 1024-65536 (SRTP)
Contact Center Agent Using
LE Studio

1.2.2 LE Anywhere - Flash Sessions



1.3 Example Application Process

The following table describes two typical Live Expert application processes–a typical LE Station application startup and a typical LE Station video call–to show how the endpoints and server communicate with one another via the protocols and ports described.

PROCESS	PROCESS DETAIL	PROTOCOL
Station and Studio start-up	1. Each endpoint logs in to the Expert Enterprise server.	HTTP or HTTPS - TCP:80 or 443
	2. Upon successful login, the endpoints create a messaging connection to the Expert Enterprise server.	OpenWire - TCP:61616 (SSL)
Customer requests an agent for a video call	1. Station sends message to Enterprise to request an agent	OpenWire - TCP:61616 (SSL)
	2. Server replies to the Station and contacts an available Studio to set up the video call	OpenWire - TCP:61616 (SSL)
	3. Each endpoint queries the NAT server to get it's external IP address	RTP & RTCP - UDP:5988-5991
	4. Each endpoint casts its video and voice streams at the other endpoint	RTP & RTCP - UDP:5988-5991
	5. Control messages are passed back and forth between the Studio, Station & Enterprise	OpenWire - TCP:61616 (SSL)
	6. Content is retrieved from the Expert Enterprise or other HTTP server	HTTP or HTTPS - TCP:80 or 443
	7. Video call is terminated	OpenWire - TCP:61616 (SSL)

1.4 LE Station Video Options

1.4.1 Video Capture Resolutions

Name	Aspect Ratio	Width	Height	Notes
QVGA	4:3	320	240	Recommended for Station to Studio capture resolution, particularly in low upstream bandwidth conditions. Not recommended for Studio to Station.
VGA	4:3	640	480	Commonly used Studio to Station resolution for the single screen version of the LE Station application.
SVGA	4:3	800	600	In cases where upstream bandwidth is higher, this may be used for Station to Studio resolution to take advantage of the two-screen capability of the LE Studio's undocked video window.
HD 720[1]	16:9	1280	720	Available on Two Screen and Single Screen HD Station formats.
SXGA[1]	4:3	1280	960	The best resolution achievable, particularly on the LE Station two-display model. Requires camera support for the uncommon resolution.

[1] Requires Intel Core i5 or i7 class CPUs on the LE Station & LE Studio PCs.

1.4.2 Settings Combinations for Common Bandwidths

The following table describes suggested video settings combinations to achieve preferred video quality for various common bandwidths.

Kiosk Location Network Bandwidth		Video Experience	Studio to Station		Station to Studio		Frames Per Second
Down	Up		Resolution	kbps	Resolution	kbps	
800	400	Good	VGA	400	QVGA	200	15
1000	600	Better	VGA	600	QVGA	300	15
1500	768	Better	VGA	800+	QVGA	400	15
1000	768	Better	SVGA	600	VGA	400	15
1500	1000	Best	SVGA	800+	VGA	600	15
1500+	768	Best	HD / SXGA	1000+	VGA	400	15
1500+	1000	Best	HD / SXGA	1000+	VGA	600	15

1.5 Total Bandwidth Requirements

RequirementsThe following table provides a list of all of the Live Expert-related media, content and other traffic that should be considered when planning for total bandwidth requirements.

Component	Bitrate (kbps)	Type	Notes
Video	100-1000+	Constant	The setting established in the Expert Enterprise plus some overhead.
Audio	55-60	Constant	
File Transfer Content sharing, printing, etc.	Available	Variable	
Other Data Transfer Credit card, text chat, etc.	Available	Variable	Lightweight data exchange.
Select & Share	Available	Variable	Lightweight data exchange.
Screen Sharing	33 - 1000	Variable	Preference is established and will use up to amount available.
Other - Non Live Expert Remote control, VPN, etc.	--	Variable or Constant	If Live Expert is deployed on a shared network connection, the other application and services will compete for the available bandwidth.

1.6 Other Important Network Factors

Network latency, jitter and packet loss are other important factors that should be held within control to provide a stable network platform to render a voice and video experience that yields high user satisfaction.

Metric	Target
Network latency between the Station and Studio endpoints	< 150 ms
Packet jitter	< 10 ms of packet jitter
Packet loss	< .05%

The types of WANs and LANs used in the VOIP network can significantly affect these metrics. The preference for type of network should use the following general protocol.

WAN

Preferred: Wired (DSL, T1, Cable, etc.)

When preferred is not available: Wireless (4G)

LAN

Preferred: Ethernet

When preferred is not available: Wifi

1.7 Peer to Peer vs. Relay

A substantial amount of development effort is applied to real time voice and video apps to minimize latency: latency in processing pipelines, latency in encoding and decoding parameters, etc. To this objective, peer to peer media is preferred to relayed media. Live Expert uses industry standard methods to attempt to establish peer to peer media, and when those attempts fail, it will failover to a relay server to establish the two way connections. Live Expert customers are encouraged to employ NAT and firewall devices that allow for peer to peer sessions. Cone NATs that are STUN-compliant and compatible with UDP hole punching, therefore, are preferred to symmetric NATs.

1.8 Network Protocols, Ports, & Hosts

The following table describes the required network transport protocols, application protocols, ports hosts & IP addresses for each of the Live Expert components.

Purpose	Live Expert Component				Transport	Ports	App Protocol	Host / Remote Endpoint	IP Address Range
	Studio	Station	Anywhere	Mobile					
Web Services	Y	Y	Y	Y	TCP	80, 443	HTTP, HTTPS	liveexpert.net	changes frequently**
								assets.liveexpert.net	changes frequently**
								omaha.liveexpert.net	54.225.249.15
								utility.liveexpert.net	50.17.104.175
Messaging	Y	Y	N	N	TCP	61616	OpenWire	le1.liveexpert.net, le2.liveexpert.net	54.83.32.32, 54.83.32.40
WebRTC Audio & Video									
Peer to Peer - Internet	Y	Y	Y	Y	UDP*	5980-5998	SRTP	Any	Any
Relay - Internet (TCP relay coming soon)	Y	Y	Y	Y	UDP*	1024-65536	SRTP	turn.liveexpert.net	54.163.255.164
					TCP				
Peer to Peer - LAN / Private Network	Y	Y	Y	Y	UDP	5980-5998		All Live Expert candidate endpoints on the private network	
Adobe Flash Audio & Video									
Peer to Peer (Preferred)	Y	N	Y	N	UDP*	1935, 19350-65535	RTMFP	Any	Any
Relay	Y	N	Y	N	TCP	443, 1935	RTMP	fms.liveexpert.net	54.83.32.132

* Requires NAT or firewall to be STUN-compliant and support UDP hole punching style replies to outbound communication.
** Amazon Web Services publishes it IP address ranges. Live Expert's apps use hosts in AWS's US East (Northern Virginia) Region.