



CHAPTER 1

Solution Overview

The Cisco Collaborative Care—Language Interpretation Service (LIS) is a distributed, flexible video-based call center that provides healthcare providers with seamless access to language translators. Timely and effective communications are essential as healthcare organizations face daily challenges with patient and clinician communications in an increasingly diverse patient environment.

Each day, precious time is lost during the cycle of care because physicians and staff without language interpretation services struggle to communicate with a multi-lingual patient population. The need for timely, reliable, accurate, and secure access to language interpretation services in a healthcare environment has become a requirement to provide not only an adequate level of care, but in some cases a life saving service.

Executive Summary

Cisco Collaborative Care—Language Interpretation Service (LIS) is an integrated system of voice, video, and data communications provisioned over public and private networks that provides a multi-media-based collaborative environment between healthcare providers and patients and their families.

Cisco Collaborative Care enables healthcare organizations to provide real-time, multi-media language interpretation to an increasingly diverse patient population. Cisco Collaborative Care leverages Cisco's Unified Communication architecture along with Cisco Medical-Grade Network architecture to provide intelligent, skill-based routing of voice and video calls. Hence Cisco Collaborative Care helps healthcare organizations eliminate time, distance, and language barriers to effective clinician-clinician and clinician-patient interactive communication. Cisco Collaborative Care provides a foundation that can be enhanced to provide other services in addition to LIS, however this document focuses on the use of Cisco Collaborative Care for LIS.

Collaborative Care Solution Description

Healthcare interactions have unique communication and language interpretation requirements. Many patient encounters rely on visual indicators for proper comprehension of patient conditions, diagnosis, and treatment. Hence an audio-only interpretation may be inadequate for effective patient diagnosis and treatment. A hospital must not only provide language interpretation, but to optimize communication they need the interpreter to be present with the patient and clinician. However providing interpreters with the required language and healthcare knowledge is virtually impossible for most organizations.

A California Healthcare Foundation survey found that 49% of patients reported not receiving required interpretation services. Hospitals partially fill this void by using multi-lingual physicians and staff, however this can detract from their primary patient care duties. This void demonstrates the need for real-time, high-quality collaborative interpretation services from a dedicated group of healthcare-oriented translators.

Healthcare language interpreter services, including sign language for the hearing impaired, provisioned over a Cisco Collaborative Care solution has been shown to:

- Improve the quality of communications
- Improve the utilization of interpreters
- Reduce impediments to language interpretations during patient encounters

Health Care Interpreter Network (HCIN) is a non-profit service in Northern California that manages >1,200 interpretations/month (>11,000 minutes) from >3000 interpreter requests/month. A recent study indicated that HCIN realized the following benefits from its Cisco Collaborative Care solution:

- Improved in-person interpreter productivity by 200-300%.
- Patient confusion due to language issues dropped from 82% to 18%.
- Reduced unnecessary patient fear from 80% to 21%.
- Lack of understanding of medications, preventative care, and self care due to language barriers reduced 58%.

Locating qualified interpreters is a challenge for both urban and rural healthcare organizations. Urban hospitals in the United States may need to offer care to patients speaking 17 different languages, while rural providers may encounter over 60 during a year. Healthcare organizations must not only find a sufficient number of interpreters, but must also ensure that these interpreters understand the context and terminology of a healthcare environment.

Many obstacles exist to offering a real-time, on-site interpretation service, centering on translator resource availability, language skills, and healthcare context knowledge. A multi-media interpretation environment with video is also required for hearing impaired patients who require sign language interpretation. Hospitals also face requirements to comply with regulatory requirements for interpretation services. For example, the U.S. Department of Health and Human Services (HHS) and the state of California both require hospitals to provide interpretation services based on patient demographics to obtain federal or state reimbursement for patient care. As evidenced by the multi-theatre proof points, there is clear need for a skilled language interpretation services worldwide. Without the capabilities to field these resources organically, an organization may either create its own interpretation service to connect its clinicians and patients with contract interpreters or contract with an organization which provides these services.

Cisco Collaborative Care provides the capabilities to meet the growing medical language interpretation services demand as the global patient population becomes more linguistically diverse. The investment in Cisco Collaborative Care development and execution positions Cisco in front of key clinical and business leaders for healthcare organizations. These leaders will find a cost effective way to provide interpretation services meeting many of the following business drivers:

- Increase staff efficiencies by streamlining the patient communication process.
- Gain economies of scale by providing interpretation services through pooling of trained medical language interpreters.
- Reduce medical errors by enabling effective communication between the patient and caregiver.
- Address unique language or communication disabilities which are non-native.
- Improve patient satisfaction with care provided in a native language.

- Eliminate organizational liabilities from using non-medically trained resources for interpretation services.
- Reduce impact on patient care and clinician productivity when using clinicians as translators rather than patient care.

Target Market

The Cisco Collaborative Care solution is best deployed in markets that have a linguistically diverse population or a population that is undergoing a change in population density. The Cisco Collaborative Care solution is targeted at:

- Mid-size to large-size healthcare organizations (>300 beds and multiple sites)
- Small healthcare organizations (< 300 beds)
- Language Interpretation Service focused on medical certified interpretation services
- Healthcare providers governed by regulatory compliance to provide linguistic interpretations to its patient community

The healthcare provider's IT Infrastructure must adhere to Cisco Medical-Grade Network architecture. In addition, the network should be capable of providing end-to-end QoS to support Unified Communications.

The effects of language diversification is a global issue affecting healthcare worldwide. This solution can be adapted to any base language and hence can address clinical needs around the world.

Collaborative Care Services Benefits

Cisco's Collaborative Care solution provides benefits to all parties in the cycle of patient care. To understand each of these benefits, it is worthwhile to examine each one individually.

Clinician Benefits

The clinician often struggles to communicate with the patient, frequently resulting in wasted time and ineffective or incomplete information. In today's healthcare environment, the language gap is far too often bridged by family members who may be negatively affected by the emotional aspects of the patient encounter. In these cases, or if no family member is available to translate for the patient, it is necessary to enlist the support of a trained medical translator. Often these translators are not available or in many cases are delayed in transit to the department or hospital requiring the interpretation.

In emergency situations the delay of treatment or inaccurate information obtained by poorly communicated pre-conditions can result in injury, unnecessary testing, and in extreme cases death. The Cisco Collaborative Care solution provides the clinician with consistent and reliable access to medically trained interpreters. Because the solution has a number of flexible deployment models, access to linguistic resources through Cisco Collaborative Care becomes an integrated part of the treatment process for patients that require interpretation services. For the clinician, the end result is greater efficiencies in all aspects of treating a language diverse patient population:

- Reduction in treatment time
- More accurate medical histories
- Consistent and complete communication with the patient

- Reliable and consistent method for obtaining access to clinically trained linguistic translators

Hospital Benefits

Healthcare organizations worldwide are faced with an increasingly diverse patient community. Effectively addressing the language barriers in a community often goes unaddressed due to the economic challenges that must be overcome to provide traditional language interpretation. The result has been governmental regulations requiring language interpretation services for portions of the language diverse population in a given service area. Even with such laws in effect, for many hospitals it is still too costly to meet these new laws. Cisco Collaborative Care—Language Interpretation Service can be used to effectively satisfy many of the regulations set by the governing bodies.

Traditional Language Interpretation Service have proven to be highly inefficient and costly. The time wasted during a clinical encounter waiting for a translator results in a lower utilization level of the clinical staff. Often hours are wasted as a patient waits for a translator to arrive to complete medical diagnosis and treatment. These wasted hours result in decreased patient satisfaction and in some cases can create undesirable medical results due to delayed patient treatment.

The Cisco Collaborative Care—Language Interpretation Service addresses all these factors by providing a solution that increases clinician efficiency at a lower cost than that of a traditional interpretation service model. This serves as a market differentiator over those healthcare providers that are either not addressing the language requirements of the patient community or addressing it through traditional mechanisms. A patient that receives a more-timely and accurate medical encounter is often more satisfied with the overall result. The final result for the healthcare provider is higher patient retention rates.

Cisco Collaborative Care—Language Interpretation Service (LIS)

The traditional method of providing interpretation services was through the use of an audio-only based interpretation service or onsite translators. The audio-only based interpretation service does not address the requirements for the hearing impaired community, while the onsite translators are often unavailable when needed because they are required to cover a number of community hospitals. In these cases, effective utilization of these valuable resources is not fully achieved.

The Cisco Collaborative Care—Language Interpretation Service addresses the shortcomings of traditional interpretation service offerings through the use of a video-based distributed call center. Now for the first time the Language Interpretation Service can increase the utilization levels of their staff while at the same time following a Cisco-tested deployment model. By using the Cisco Collaborative Care—Language Interpretation Service offering, the LIS can more quickly bring additional healthcare facilities online. The end result is increased revenue opportunity in addition to more a more rapid and consistent installation and turn up.

Patient and Family

For those in the community that do not speak the native language or are hearing impaired, access to healthcare can be a series of communication challenges. These challenges for scheduled care often start at the time of admission to the healthcare facility. For those patients whose care requires urgent attention, the communication challenges begin during a highly emotional time, often in the emergency department.

In all cases of patient interaction, the Cisco Collaborative Care—Language Interpretation Service addresses the needs in a timely and consistent manner. The result for the patient and family members who are present is a more thorough medical encounter and a deeper understanding of the diagnosis and treatment options available.

Increased patient and family satisfaction is the goal of any healthcare provider, but the ability to effectively communicate is the basis for optimum patient treatment in all of its forms.

Features

The Cisco Collaborative Care—Language Interpretation Service offers the ability to meet the linguistic demands of a healthcare provider's patient community, including:

- High-quality audio (G.722)
- Sign language support for the hearing impaired
- Rapid solution installation and turn up
- Robust security
- Support of third-party video endpoints
- Flexible deployment models which both fit current demands, but also allow future expansion to other deployment models.
- Leverages investment in network infrastructure through converged voice, video, and data
- Preselected and validated deployment partners to assist in rapid solution installation, training, and turn up
- Voice or voice and video call options
- SIF video quality with H.264/ MPEG4 for high video compression
- NTSC 352x288 resolution and PAL 352x240 at 25+ fps for video
- Variety of clinician endpoints (PC-based or hard endpoint) with built-in video display, camera, voice, and echo cancellation capabilities
- Fast routing to interpretation agent
- Priority queuing and call escalation
- Call routing based on skill attributes to appropriate queues based on IVR
- Calls in queues are provided with a status of wait time and option for emergency service escalation
- Calls in queues have music on hold as well as periodic status messages.
- Customizable IVR scripts to meet business requirements
- Multiple deployment models to meet business needs
- Solution is multi-lingual and supports sign language
- Scales up to 50 queues and 300 concurrent sessions
- Interpretation agents can be associated to multiple skill groups
- Secured with firewall with dynamic pinhole for voice and video ports
- NAT and PAT support to assist with network IP addressing conflicts

Dependencies

The Cisco Collaborative Care—Language Interpretation Service is enabled through the use of a number of services, video endpoints, applications, and a compliant Cisco Medical-Grade Network architecture. A brief review of each dependency is shown below.

Unified Communications

The solution is built upon the Cisco Unified Communications product portfolio. Through the use of Cisco Unified CallManager and Unified Contact Center Express (UCCX), reliable skills based end-to-end video communication are established.

The Cisco Unified CallManager is used to route calls between the various endpoints which are registered to it. CallManager can be configured in a redundant fashion, often referred to as a CallManager cluster. This multi-server environment offers the greatest level of redundancy and should be strongly considered for any mission critical delivery of voice/video.

Clusters of Unified CallManagers can communicate with other clusters through the use of various types of virtual trunks. These trunks emulate that of traditional telephony-based trunks which are often used to connect PBXs or CallManagers over traditional transports such as T1-PRI interfaces. The Cisco Collaborative Care—Language Interpretation Service solution relies upon a dedicated QoS-capable IP network to provide connectivity between healthcare organizations and Language Interpretation Service.

UCCX provides the means to interact with the caller to determine their needs and to route the call to the most appropriate agent. This is accomplished through the use of IVR Scripts which handle the business logic of finding the “best” interpretation agent available in a number of flexible deployment models. Additionally, UCCX includes the ability to interact with the caller through the use of a Web interface. This interface allows the caller to specify a call back number through a custom webpage. Various call attributes can be collected from the web page presented to the potential caller. In this case, those attributes would be the desired language and possibly the gender of the agent being requested.

From the interpretation agent’s perspective, interaction is accomplished through the use of a Microsoft Windows-based application called the Cisco Agent Desktop (CAD). This Windows-based application allows the agent to log on to the UCCX System and to toggle their state from “not-ready” to “ready” and vice versa. In addition, the CAD application allows the agent to see the number of calls in the skill-based queue to which their user ID is associated. Call statistics are available which include the longest call hold time.

In addition to CAD, a simplified version of this application is available as an XML application, the IP Phone Agent (IPPA). This XML application executes directly on the 7961, 7971, and 7985G personal desktop video phone.

Endpoints

The Cisco Collaborative Care—Language Interpretation Service has been tested using Skinny Call Control Protocol (SCCP), a Cisco defined protocol for messaging between an endpoint and Cisco CallManager. The software-based endpoint from Polycom (PVX) was tested using the H.323 protocol.

The use of SCCP is critical for the proper negotiation of video call parameters between endpoints because of the high level of maturity in the product sets. Over time, it is expected that the Cisco Collaborative Care solution will employ endpoints using SIP and H.323 communication protocols.

All endpoints that have been tested provide resolution at the SIF standard, which is 240x352 pixels for locations using the NTSC (National Television System Committee) standards and 288x352 for those using the European PAL (Phase Alternating Line) standard.

Language Interpretation Service (LIS)

The healthcare provider has the option of contracting with an external LIS company to augment the deployment of the Cisco Collaborative Care—Language Interpretation Service. Because the LIS connects too many foreign networks, great care must be taken to assure that proper security measures are in place. By using Cisco Adaptive Security Appliances (ASA) to provide NAT/PAT services, it is possible to inspect the SIP session traffic coming inbound from the healthcare provider. Through the use of the SIP inspect function found on the ASA Firewall, a pinhole is dynamically created in the firewall to permit the inbound Real Time Protocol (RTP) to traverse the firewall. Likewise on the healthcare provider edge, the same is done to only permit inbound voice calls from the recognized SIP endpoint located in the LIS network.

IVR/Script

The call control logic which interacts with the caller is accomplished through the use of a custom healthcare supplied script. This script executes on the UCCX server and is engaged when an inbound call is directed at one of the configured pilot numbers.

These pilot numbers are referred to as Java Telephony API (JTAPI) Triggers. The script plays a number of audio files to the caller to determine which language the caller desires. Through the use of Interactive Voice Response (IVR), UCCX determines which telephone key was selected, which in turn drives the call control logic. If the healthcare provider lacks the technical skill to develop these scripts in-house, the development can be subcontracted to external UCCX contractors.

Telco/Service Provider

The telephone service provider is commonly used to provide external network connectivity between collaborating healthcare providers or between healthcare providers and that of external Language Interpretation Service. The Wide Area Network (WAN) must be capable of fully supporting the service level requirements through the use of QoS mechanisms. In addition, full mesh connectivity is desirable between locations as some deployment models discussed in this solution require any-to-any connectivity. For these cases, the Telco/Service Provider should be able to provision a Multiprotocol Label Switching (MPLS)-based network.

Scope of the Solution

The performance, security, and reliability of the Cisco Collaborative Care—Language Interpretation Service solution are critical to its successful use and deployment within a healthcare provider. This document therefore assumes that the solution is deployed on a Cisco Medical-Grade Network (MGN) compliant infrastructure. The attributes that best describe a Cisco MGN are resilient, protected, responsive, and interactive. These fundamental characteristics can be achieved through adherence to the set of Cisco best practices for each of the technologies being deployed and outlined in the Cisco MGN architecture.

This document does not cover the installation steps required by each product in the solution. For detailed configuration information we suggest you consult the individual product documentation. Because the solution spans a wide array of technologies and product sets from both Cisco and third parties, we recommend that a certified installation partner be consulted during the planning, configuration, installation, and training phases of a deployment for optimum results.

The document also assumes that the healthcare provider will develop the IVR scripts themselves or use a third party to create the call control logic necessary to interact with the caller. Cisco does not provide the scripts that are used to drive the call control logic.