

# Migrating Services from POTS to Packet

*How Gateways Can Play a Key Role*



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**The VoIP revolution has rapidly moved from niche technology to the mainstream for both fixed and mobile networks.** In the process, products and services have been migrating from the traditional phone networks to a variety of underlying packet networks. This has resulted in important network solutions such as SIP Trunking, which uses the Session Initiation Protocol (SIP) to run over packet networks to connect Enterprises with today's service provider networks. Both Enterprises and Service Providers began to look at SIP trunking as an effective way to consolidate their networks and reduce costs. At first, as with any new technology, early adoption of SIP trunking was slow. Eventually, however, more and more service providers began offering SIP trunking services, particularly in concert with solutions such as unified communications (UC). Today, 60% of businesses use SIP for their communications<sup>1</sup>. In addition, recent market studies show anticipated annual growth of 9.3% for worldwide SIP Trunking services.

As the migration to packet networks continues, customers and Service Providers need to consider how existing services can be supported and how this will impact their plans for moving from traditional networks such as Plain Old Telephone Service (POTS) to modern fixed line and mobile networks. The initial focus of SIP Trunking has been to ensure that the most commonly used services such as Voice and Facsimile could be supported transparently and that related media such as tones could also be supported. However, there are numerous other services that run over POTS networks for applications such as safety and security. Some experts have estimated that there are about 24 million specialty lines that are currently used in North America to support devices which include elevators, gates, fire panels and others which provide critical safety and security services. Therefore, any migration strategy away from an existing POTS network needs to ensure that critical non-voice services can continue to be supported.



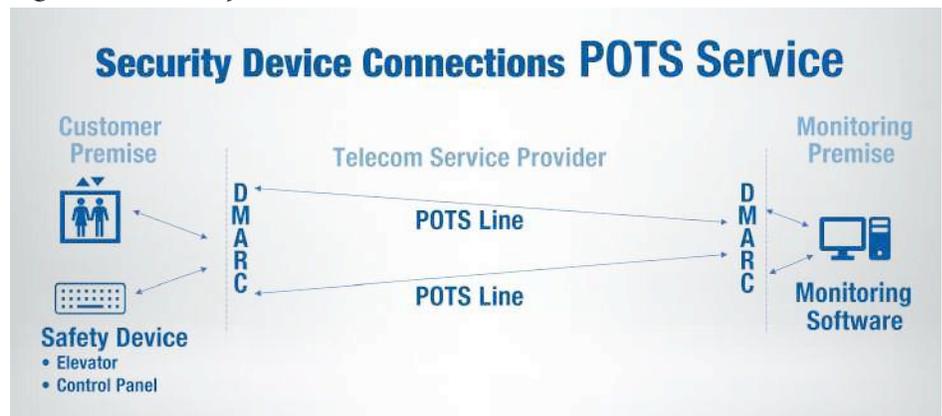
This white paper will consider how Enterprises, Services Providers and other stakeholders can devise cost effective strategies which will enable these important safety and security services to be supported even as the underlying networks evolve.

## How Security Devices are Supported on POTS Networks

Analog telephone lines are sometimes known as Plain Old Telephone Service (POTS). They have co-existed with other telephone network technologies for many years. In recent years, traditional networks such as POTS and later circuit-switched networks have been supplemented and sometimes replaced by packet networks.

Let's consider a well-known device such as an elevator and see how it has connected to analog phone lines for purposes of two applications – a voice call and to confirm it is still active.

*Figure 1 – Security Device Connections – POTS Service*



The phone headset in the elevator can be used to initiate an emergency voice call, which could apply in the event of unexpected circumstances. In turn, an embedded modem could be used to dial out to a monitoring system and initiate a short analog data session using traditional data communications. In addition, the monitoring system will also support equivalent modem technology and be able to participate in a short data collection session with the elevator's modem to confirm the elevator is still active.

For this example, all of the telephone connections are analog, so that all information, whether voice or data, is communicated via analog signals.

The scenario we are describing here is typical not only for elevators, but also for other safety and security devices such as gates, alarms and fire panels. The various devices on the customer premise all are designed to connect to the analog phone network provided by a service provider. In our next section, we'll consider how these same devices can be supported if plans are developed to migrate to next generation packet and mobile networks.

## Support for Security Devices Using a Managed POTS Migration Solution

There are numerous challenges to be addressed in any migration scenario for the support of security and safety devices which have been designed to work over analog networks. First, these devices provide critical business services and need to work in a reliable manner. In addition, the devices and related on-premise technology often represent a substantial amount of investment for an enterprise or industrial company. Further the devices have typically been integrated over the service provider's telephone network to connect to internally or externally managed monitoring systems. These monitoring systems use data communications protocols which need to be supported and understood both by the individual security devices and by the monitoring system. In summary, from a business perspective, it will be valuable if the end point security devices and the monitoring systems can both be maintained "as is," but still find a way to connect via more modern network technology.

There is a migration approach which can maintain the existing investment by customers in both their security devices and their associated monitoring systems. Let's consider how this can work.

Since the early days of Voice over IP, there has been a need to support both existing phone networks (such as POTS) and packet networks. As a result, telecommunications equipment vendors such as Sangoma have developed a wide array of media gateways which can provide translation of signals and media between traditional networks and the packet network. Today's packet networks often use the Session Initiation Protocol and services such as SIP Trunking are used to connect from customer premises to the service provider network.

Support for existing analog phone devices requires specialized media gateways which can connect to the traditional devices and also connect to SIP-based packet networks. In addition, the security devices we've been reviewing also use analog modem technology and related modem protocols. Therefore, the analog media gateways need to have deep support for modem technology and be able to transmit the related data via SIP sessions.





Figure 2 – Security Device Connections – POTS Replacement



Based on all of these considerations, it's important that the solution integrator makes a careful choice of an analog media gateway which has all of the necessary analog line support, includes powerful support for voice and data communications and can translate voice or data via SIP sessions.

The solution integrator will also typically work with one or more telecommunications service providers to provide a SIP connection from the media gateway to either fixed line or mobile networks which are also SIP capable. This SIP connection via the service providers will enable the customer to connect to the centralized systems which monitor the health of the customer's security equipment such as fire panels, gates or elevators.

### Stakeholders in POTS Migration Solutions

In the traditional support model for security, the security devices on the customer premise are designed to send analog signals which can connect to the phone company at a demarcation point and then get transmitted over the copper lines which made up the POTS network. In a POTS migration solution, the customers want to retain the ability to use their security devices and still be able to connect over a phone network to the applicable centralized monitoring devices. Let's consider who the stakeholders for such migration solutions may be.

#### Customers

Customers who currently rely upon services such as voice, data and security solutions that run on analog POTS lines will be among the key stakeholders for a POTS migration project. As noted earlier in this paper, they often have a major investment in existing security devices such as fire panels, gates and elevators which currently connect to a POTS line. These

companies may include facilities with storefronts, warehouses and a variety of industrial operations. If the analog lines are retired, they will be highly motivated to work with solution integrators, equipment vendors and telecommunications service providers to find approaches which maintain their existing security services, including support for their security devices and associated monitoring systems.

## **Telecommunication Service Providers**

Telecommunications Service Providers have been the organizations which have owned the POTS-based analog telephone lines and provided a variety of telephone-based services to their customers. Many of these service providers are in the process of retiring their network of analog lines, but in order to proceed with these plans, they typically need to work with one or more stakeholders to develop replacement solutions. Customers will often want to be able to preserve their existing investment in security devices which currently connect to a POTS network, but may be open to working with their current service providers to run these services over alternative networks. Depending upon the connection requirements, the replacement network may be a direct connection which supports packet-based services using SIP or may use routing solutions that enable selective connection to both fixed and mobile networks. The mobile providers will often use relatively new technologies such as Long Term Evolution (LTE) to run fourth generation (4G) services or emerging services such as the fifth generation (5G) network.

## **Telecommunications Equipment Vendors**

Telecommunications Equipment Vendors play a key role in POT migration services, because they can provide equipment such as media gateways which enable connections between traditional phone networks such as POTS, the Public Switched Telephone Network (PSTN) and newer packet-based technologies which provide Internet Protocol (IP) services. For the specific case of POTS networks, analog media gateways are a key tool which can support existing customer equipment with analog connectors and then translate these sessions into IP-based packet protocols such as SIP. For the specific case of security protocols, it is important that the analog media gateways also have a robust data communications capability. There is a need to support existing modem protocols on the analog side and then use SIP sessions to pass through this tonal information to the monitoring systems on the far end. In the next section, we will review media gateway requirements to enable POTS migration in more detail.





## **Solutions Integrators**

Solutions integrators play a key role in developing solutions which address the challenges of migrating from a POTS network. Customers will want to preserve their investment in security equipment such as fire panels, gates and elevators which have traditionally run over analog POTS lines, but still be able execute the critical business services which the security devices have supported. Different types of companies can provide integration services, but a key requirement is to have sufficient skill and knowledge of requirements on both the customer premise and on the telecommunications network side. It is also helpful if the solution integrator has access both to their own technologies to help develop these solutions and an eco-system of third parties such as telecommunications equipment vendors and one or more telecommunications service providers. This enables the solutions integrator to provide customized solutions which take advantage of “best of breed” components, networks and services.

## **SIP Trunking Providers**

As telecommunication service providers make plans to retire analog phone lines, they also need to determine the replacement technology for these analog trunks as part of their POTS migration strategy. A common solution is to provide SIP trunks, which use the Session Initiation Protocol for signaling and can also support common types of media used in phone calls such as voice, fax and data calls. A telecommunications service provider can either directly provide SIP trunks to their customers or engage with one or more third party SIP Trunking Providers who offer SIP Trunking Services.

For the security services which had run over POTS lines, a SIP trunk provides a way for the telecommunications service to continue to support connecting the existing devices on the customer premise to an associated monitoring service which is now accessible via a SIP trunk. However, it is important to confirm that the overall solution provides end-to-end connectivity and that the interaction between end points on the customer premise and the monitoring service continues to operate reliably. Therefore, the solution integrator will want to confirm that partners who provide SIP Trunking services can properly handle the data sessions which enable the monitoring to take place in real time.

## **Choosing A Media Gateway for POTS Migration**

The team which is planning a POTS migration strategy will need to devise a solution which can effectively support a customer’s existing investment

in phone-based technologies and the services which need to be supported. The choice of a media gateway is a key decision for such planning. Let's consider some key criteria for this choice.

**Vendor Experience** – The telecommunications equipment vendor needs to have in-depth knowledge of both the analog telephone network used for POTS and the newer technologies used to connect to IP networking, including substantial experience with SIP. This expertise should be reflected in the media gateway products and other product lines provided by the vendor and the versatility of the technology in the gateways to handle voice, fax and data applications on both the analog and IP sides of the gateway. For the specialized security applications discussed in this white paper, the company should have deep expertise in a wide variety of data modem technologies and the gateway must be able to support the data modem protocols which are most widely used for data monitoring applications. The company's expertise in the analog media gateway market should be evident based on a history of successful participation in this market and by the selection of products which are currently available for customer purchase.

**Analog Gateway Capabilities** – The analog gateway should be flexible in terms of the number and types of ports which are supported on the analog side. Depending upon the application, either FXS or FXO support in the ports may be required. In order to support existing analog phone devices (phones, safety panels, fire panels, elevators), the gateway must provide FXS port support. If the requirement is to connect to analog phone lines, the gateway must provide FXO support. For the security applications which are the focus of this white paper, the FXS support will enable connection to the traditional phone devices and then the gateway will translate these sessions into packet-based protocols such as SIP.

**SIP Gateway Capabilities** – The IP side of the gateway needs to be able to support the SIP protocol standards, notably version 2 of SIP as standardized in RFC 3261 and a variety of other SIP standards depending upon the applications. The SIP Trunking approaches used by the Telecom Service Provider may also influence which additional SIP standards need to be supported by the gateway.

**SIP Multi-Media Capabilities** – The media gateway needs to be able to support a variety of different media types in its sessions. The starting point for media support is in the area of voice protocols, where needs to support both narrowband lossy protocols such as G.729 or G.723 and lossless





protocols such as G.711 a-law and u-law are important. The latter types of media using G.711 are frequently used to negotiate a data passthrough mode which can enable data modem sessions to use SIP to transport tonal data; this is a critical requirement for enabling analog devices to connect with far end monitoring systems which also support data modem protocols. Depending upon the applications, capabilities such as facsimile (via T.38 or G.711) and the passage of analog tonal data may also be important.

**Data Modem Capabilities** – The media gateway needs to have built-in support for a variety of data modem protocols which begin with various Bell system protocols and then continue later with TIA V series protocols ranging up to V.90.

**Integration** – The gateway needs to have an effective integration between the analog and IP sides of the device in order to take full advantage of the requirements for device or line connection on the analog side and the requirements for SIP and multimedia support on the IP side. The integration needs to provide effective support for both signaling translation and media transcoding between the analog and IP sides.

### **The Scalable Gateway Choice for POTS Migration: Vega 60G**

Sangoma has a long history of meeting marketplace needs for telecommunications equipment, including a set of product families to meet customer needs for media gateways. In the last section, we reviewed the criteria that customers should consider in selecting the right media gateway for projects to enable a migration from POTS while still supporting their investment in current safety and security devices.

Let's review the reasons why the Vega 60G Analog Gateway is a strong choice for customers, solution integrators and telecom communications service providers to meet their needs for POTS migration projects.

**Vendor Experience** – Sangoma has years of market proven experience in meeting customer needs for media gateways and the Vega family is the product family of choice within Sangoma for addressing Analog and BRI gateway needs. Building on a strong tradition of internal development and strategic acquisition, Sangoma has strong engineering and support teams backing up all of the media gateway products. In recent years, Sangoma has worked with its customers and integrators to meet the specialized needs of POTS migration and the Vega 60G analog gateway is a key element of these solutions.



**Analog Gateway Capabilities** – The Vega 60G analog media gateway is a scalable solution for meeting a variety of analog gateway needs. Available in both 4 and 8 port models, the Vega 60G can be used to support either FXS or FXO ports. For POTS migration, the FXS port models enable a customer to attach analog phones, fax devices or security devices and continue to support their existing services, while enabling connectivity to SIP networks via the IP gateway side of the product.

**SIP Gateway Capabilities** – Sangoma Vega 60G gateways support the standard versions of SIP, including both version 1 and the latest version 2 as per RFC 3261 and various other standard SIP RFCs. Connectivity on the IP side of the gateway is provided by a single RJ-45 Gigabit Ethernet port which supports up to 1000 Base T and is backward compatible with 100Base T and 10 Base T for full or half duplex operation.

**SIP Multi-Media Capabilities** – The Vega 60G gateway supports a diverse array of voice codecs including G.729AB and G.723.1 for compressed voice and G.711 a-law or u-law for lossless operations. In addition, the efficient G.726 codec supports quality voice operations. Facsimile support is provided via either T.38 or G.711, with an option to start with T.38 as a default and then fallback to G.711 based on the results of negotiations. As noted below, the G.711 codec can also be used for pass-through of data modem operations in tonal form.

**Data Modem Capabilities** – A strong point of the Vega 60G is its support for a wide variety of traditional modem protocols which include various Bell and other data protocols, as well as standard V series protocols ranging up to V.90. Modem data sessions can be passed from the analog to SIP sides of the gateway due to the built-in integration of the tonal modem protocol support on the analog side with the G.711 pass-through facilities on the SIP side. The Vega 60G also has the flexibility to designate FSX ports as data ports and to enable specialized settings needed to effectively support data passthrough modes.



Integration – The Vega 60G analog gateway is the newest member of the Vega Analog Gateway product family and was designed to have tight integration between its analog and SIP sides. Either 4 or 8 analog ports can be used for support of either FXS or FXO needs and these are integrated with the Gigabit Ethernet ports on the IP side. The Vega 60G has versatile support for both signaling translation and media transcoding between the analog and IP sides of the gateway.

In summary, the Vega 60G meets the key needs for POTS migration projects and can be a vital component in enabling customers to maintain their investment in their analog voice, fax and security services while providing connectivity to packet-based networks in place of copper-based analog phone lines which are being retired.

## Conclusion

Telecommunications networks are continuing to evolve and older portions of the networks such as Plain Old Telephone Service (POTS) are being retired. This presents a challenge for enterprise and industrial customers which rely upon investments in voice, fax and security products that are designed to work with POTS networks. In this white paper, we have reviewed pro-active approaches that can be taken by customers to maintain critical services and related product investments during this period of network transitions. In the process, customers can take advantage of newer network connectivity options which include SIP trunking and a choice of connections to both fixed line IP networks and the latest generations of mobile networks such as LTE, 4G and 5G.

The solutions to these network evolution challenges may involve collaborations among multiple stakeholders including Solutions Integrators, Telecommunications Equipment Vendors, Telecommunications Service Providers and SIP Trunking Providers. A key component for POTS migration solutions is the availability of Media Gateways which can provide a bridge between analog phone devices (for voice, fax and security applications) and SIP-based packet networks.

We have reviewed key requirements for selecting analog media gateways and demonstrated how the Sangoma Vega 60G gateways provide a scalable and flexible solution to meet the challenges presented during this time of migration from POTS networks to newer fixed line and mobile network infrastructure. In particular, the Vega 60G gateways have the flexibility to enable customers to maintain existing investments in analog security devices such as fire panels, gates, alarms and elevators and provide pass-through connectivity to monitoring systems which manage and confirm the health of a customer's security devices.

In summary, as customers, service providers and integrators strive to develop solutions to address the challenges presented by the pending retirement of POTS networks, Sangoma can be an essential partner by providing the market-proven Vega 60G media gateways as a vital component of these solutions. To learn more about the Vega 60G media gateways, or to engage with us on solutions for challenges such as the migration away from POTS networks, contact your Sangoma representative or visit us online at [sangoma.com](http://sangoma.com).

## Sources

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