Interactive Voice Response (IVR) systems

Cisco provides an option for running an interface to Interactive Voice Response (IVR) systems. The IVR interface software allows IVRs to take advantage of Unified ICM call routing features. For example, an IVR can use post-routing capabilities to select targets for calls it needs to transfer. The IVR interface software runs on a standard PG hardware platform. It allows the Unified ICM to route calls to targets on an IVR and collect data from an IVR for use in call routing, real-time monitoring, and historical reporting. The IVR interface is not specific to a particular IVR system or manufacturer. It is based on an open IVR model. Many IVR systems support Cisco's Open IVR Interface Specification, including Unified CVP. For a list of IVRs that support this interface, contact your Cisco representative.

To plan for this IVR option:

• Review the options for integrating IVRs into the Unified ICM system.
• Determine if any IVR programming or application development is necessary.
• Review the Peripheral Gateway platform requirements.

• IVR configuration options, page 1

IVR configuration options

IVRs can be located at the customer's call center site or in the IXC network. At the call center, you can connect the IVR on the network side of the ACD or “behind” the ACD. In the IXC network, the network provider can offer the IVR as a service.
In an Unified ICM configuration that includes an IVR, you configure the ACD so that it can transfer calls to the IVR. The following figure shows some of the capabilities of the IVR in an Unified ICM system.

**Figure 1: IVR/ICM Integration Overview**

Capabilities of IVR:

1. In most Unified ICM /IVR configurations, calls continue to be Pre-Routed by the Unified ICM system.
2. When a call is routed to an IVR, the IVR answers the call and interacts with the caller.
3. The IVR can access a host system (for example, a customer profile database) to retrieve more information to help process the call.
4. Often, the caller can get all the information he or she needs through simple interaction with the IVR. In some cases, however, the IVR needs to transfer the caller to an agent or another call resource.
5. In some configurations, the IVR can invoke post-routing to select an agent from anywhere in the call center enterprise. To do this, the IVR sends a route request to the PG. The PG forwards the request to the Unified ICM system, which responds with a new destination for the call. The PG returns the new destination to the IVR. The IVR then signals the ACD or network to transfer the call to the specified destination.

The way in which an IVR is integrated into the Unified ICM system affects the flow of call processing and determines the types of data the Unified ICM can collect from the IVR. For example, an IVR that has a direct
interface to an IVR PG provides the Unified ICM system with data that is used in call routing, monitoring, and reporting. A configuration in which the IVR has an interface only to the ACD has more limited capabilities. You can integrate IVRs into the Unified ICM system in several different ways. Each integration option provides a different set of Unified ICM functionality.

**Configuration with ACD PG only**

In this option, the IVR is attached only to the ACD. The ACD, in turn, is attached to a PG. The PG is running the Cisco peripheral interface software (PG software process) required to communicate with the specific type of ACD. There is no direct interface between the IVR and the Unified ICM system (in other words, an IVR process is not implemented).

*Figure 2: Configuration With an ACD PG Only*

In this configuration, you must connect the IVR to an ACD that supports post-routing. The IVR and ACD cooperate so that calls are transferred from the IVR to the ACD, and then post-routed by the ACD via the PG. The PG in this configuration has only the ACD peripheral interface software. It does not have the IVR interface software; therefore, it does not provide the IVR with full access to post-routing.

In the preceding figure, the IVR can handle a call in two different ways:
• The IVR can handle the call to completion (for example, if the caller wanted current billing information and needed no further assistance, the IVR can complete the call.)

• The IVR can transfer the call to the ACD. The ACD can then use the PG to post-route the call.

Configuration with IVR and ACD PGs

This configuration option is similar to the previous option except that an IVR process and host link to the IVR are implemented. In addition to monitoring the ACD for real-time agent and call event data, the PG can monitor the IVR for call and application data and control the movement of calls into and out of the IVR. The IVR data is also forwarded to the CallRouter for call routing and reporting.

As shown in the following figure, you can install the IVR and ACD interface software on the same PG hardware platform.

*Figure 3: Configuration with IVR and ACD PGs*
Network-side IVR with IVR and ACD PGs

The next configuration option places the IVR on the network side of the ACD. In this configuration, the IVR is connected to the network and potentially to the ACD. The IVR can receive calls directly from the network without ACD involvement. The Unified ICM can pre-route these calls, but it is not a requirement.

The IVR can also receive calls from the ACD (for example, when an agent transfers a call to the IVR). Again, the Unified ICM may or may not have routed these calls. The following figure shows an example.

![Network-Side IVR with IVR and ACD PGs](image)

Once the IVR receives a call, it can handle the call to completion or transfer the call off-IVR for subsequent handling. The IVR can also use post-routing to select a target for the transfer. If the IVR transfers the call to an ACD, the IVR may or may not request routing instructions from the Unified ICM.

This configuration is different from the earlier options in several ways:

- The IVR is connected to both the network and the ACD.
- You can transfer a call that originated in the network to the local ACD by tandem connecting a second trunk with the original trunk. You can transfer a network call to a remote ACD either by connecting a second trunk in tandem with the original trunk, or by invoking a “call take-back” feature in the network.
- You can use post-routing to transfer a call that originated at the local ACD to any target.
In-network IVR with ACD PG only

In this configuration, the IVR is provided as a service by the network service provider. The PG monitors the ACD and forwards data to the Unified ICM system for call routing and reporting.

When the caller dials the toll-free number, the Unified ICM instructs the network to transfer the call to the network-based IVR. The network IVR then prompts the caller for input. If the caller requires additional information (such as speaking to an agent), the IVR dials a “hidden” toll-free number. The network then queries the Unified ICM system for a routing destination. The Unified ICM system returns a routing label and the network transfers the call to the specified ACD and DNIS. An agent at the ACD can handle the call to completion or transfer the call for subsequent handling.
In-network IVR with IVR and ACD PGs

In this configuration, the IVR is provided as a service by the network provider. The network transfers all calls to a destination IVR. The IVR either handles a call to completion or transfers the call to another resource (for example, an agent at an ACD).

Figure 5: In-Network IVR with IVR and ACD PGs

IVR transfer routing using third-party call control

In this configuration, the IVR invokes a transfer request to transfer a call to the ACD. The IVR uses a CTI link to the ACD which sets variables in the transfer request (for example, CED, DNIS, CLID, Social Security...
number, or account number). This configuration is viable only if the IVR is attached to an ACD that supports post-routing. The following figure provides an example of this configuration.

Figure 6: IVR Transfer Routing with Third-Party Call Control

When the ACD receives the transfer from the IVR, it makes a route request to the PG to conduct an enterprise-wide agent selection. The PG routing client sends a route request to the CallRouter. The CallRouter passes a response to the PG and on to the ACD. The ACD then transfers the call to the specified destination.

IVR programming and application development

The Open IVR Interface allows the Unified ICM to see some level of IVR application-specific data (for example, menu selections). An IVR application developer can use the Open IVR Interface to implement call routing (routing client) and monitoring capabilities.

The IVR routing client allows the IVR to send route requests to the Unified ICM via the PG. These requests can include data variables such as Customer ID and Menu Selections. The Unified ICM system uses this data to instruct the IVR where to transfer the call. The application developer uses the IVR monitoring interface to send IVR port and application activity data to the Unified ICM system for call routing and reporting.

IVR Peripheral Gateway

The Cisco IVR interface software runs as a logical PG on a standard Peripheral Gateway hardware platform. A single PG hardware platform can support a maximum of two logical PGs. A single PG platform may run one or two IVR PGs or an IVR PG and an ACD PG. For example, you can have a PG hardware platform that runs an Aspect CallCenter PG and an IVR PG. A logical PG can have PIMs for one type of ACD, plus an IVR PIM. The hardware platform must have sufficient capacity to handle the aggregate load from all attached peripherals.
The multi-instance CTIOS configuration supports up to ten logical PGs on a single PG platform. These PGs are configured as separate customer instances.

In the following figure, a duplexed set of PGs serve both an IVR system and an ACD system. These PGs are equipped with both ACD and IVR interface software.

The IVR can also be on a System IPCC PG or a IPCC Generic PG. The IVR Peripheral Gateway can run in simplexed or duplexed configurations. In a duplexed configuration, only one side of the PG has an active connection to the IVR at a time.

When multiple IVRs are connected to a PG, IVRs that use poll-based monitoring cannot be mixed with IVRs using any other kind of monitoring.

Figure 7: IVR-to-PG Interface

For information on how IVR systems fit into the Unified ICM data communications networks, see Datacom requirements.