

Quintum TASQ Technology: The Auto-Switch Process

To enable your Tenor Network to perform Auto-Switching for PBX-to-PBX calls, you need to configure the Auto-Switch Parameters in the “PBX Trunk Groups” tab of the Browser-Based (CAM) Configuration Tool or the “*pbxtg*” section of the Command Line Interface Configuration Tool (CLI). There are three settings that are pertinent to Auto-Switching here; *asenable*, *astype* & *asnumber*:

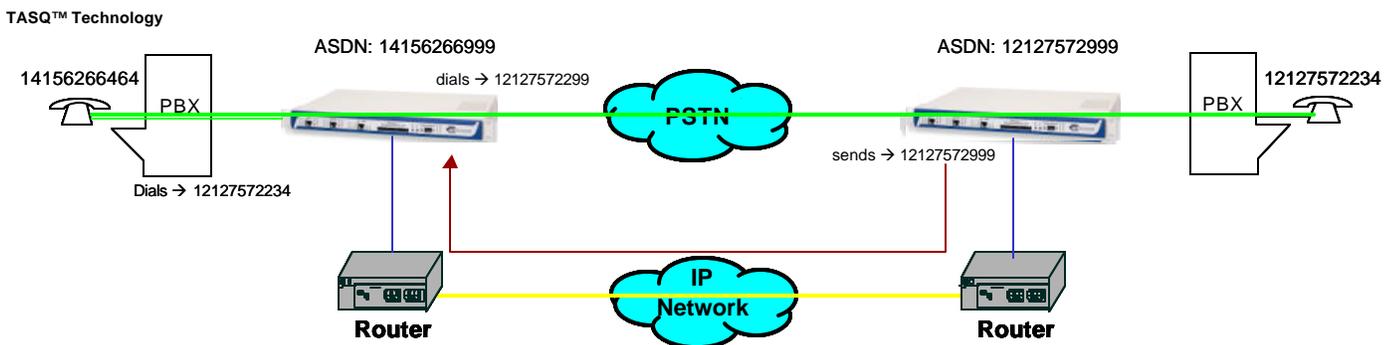
- First, set Auto-Switch Enabled (*asenable in CLI*) to yes (1).
- Then, set Type (*astype in CLI*) to DID (0) for an all Digital Tenors and to No-DID (1) on all Analog Tenors
- Finally, set Number (*asnumber in CLI*) to the phone number of the line connected to this Tenor in international format (e.g. 17324609000).

Once you have configured each unit on your network and submitted the changes, the Tenors will be ready to do Auto-Switching.

Digital Tenor to Digital Tenor (or when the Termination Tenor is Digital)

Most digital lines provide the DID or the dialed number when sending a call to the Tenor. So when the Digital Tenor receives an incoming call from the PSTN, digits are delivered; but possibly only the last 4 digits. The Tenor sees these digits and can determine how to route the call.

For our Auto-Switch Scenario involving a Digital Tenor, we assign a phone number as the Auto-Switch Number (*asnumber*) and set the *astype* as DID (0). Please be sure that this phone number is not used for anything on the PBX in the Digital/DID case, as the call will not be routed to the PBX. Whenever a call comes from the PSTN with these digits, the Tenor knows immediately that it is an Auto-Switch call from another Tenor, and goes through the Auto-Switch process immediately. With Digital Tenors and lines, auto-switching will work even if the IP cable is pulled out of the Tenor. (See next page to review the process in detail)





Digital Tenor Auto-Switch (continued)

1. The left side (Origination Side) places call to the right side (Termination Side).
2. Call goes over IP and connects to the destination (Through the "Termination Tenor").
3. When the call connects, the Termination Tenor sends, over IP, its Auto-Switch DN to the Origination Tenor, and tells the Origination Side that it expects to see DID <direct inward dialing> digits from the PSTN if an Auto-Switch call is necessary.
4. The Termination Tenor also sends the Origination Tenor a unique Auto-Switch ID number for this (and each) call.
5. While the users are conversing, the IP network degrades.
 - a. Users may hear noise on call due to IP degradation.
 - b. Tenor detects IP degradation.
6. When the Packet Loss exceeds the allowable threshold, the Call Origination Tenor starts to initiate a connection over the PSTN to Termination Tenor's Auto-Switch DN using a series of In-Band signals.
 - a. The Termination Tenor sees the call come in from PSTN.
7. The Termination Tenor identifies the call as an Auto-Switch call by the digits that were delivered by the PSTN.
8. Termination and Origination Tenor synchronize on the PSTN channel to confirm the Auto-Switch and which call is to be switched.

The call is then switched seamlessly, without any User intervention!

Notes:

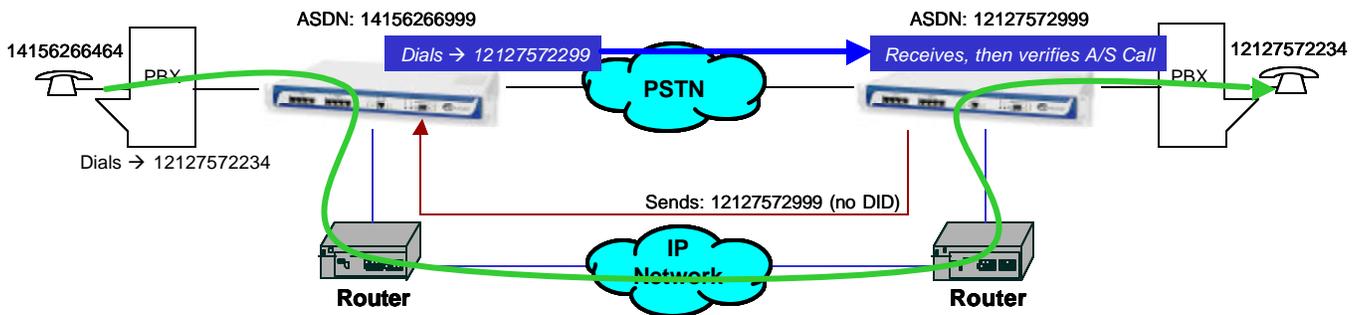
- Auto-Switched calls do not get switched back to IP.
- Calls get switched one at a time, not in a block.
- Calls get switched in age order; oldest first.
- The Tenor does not have to wait for first call to drop before switching next call.
- The Termination and Origination Tenors connect the PSTN channel to the active voice channel and disconnect the IP connection.
- Auto-Switch DN on Termination Tenor becomes available for next call.

Analog Tenor to Analog Tenor (or when the Termination Tenor is Analog)

Unlike Digital lines, Analog lines are not capable of delivering the dialed numbers and therefore, the Tenor cannot readily identify a call as an Auto-Switch, not by the digits anyway. So, as you will see the process is different than in our Digital Example above.

In most cases where there are multiple analog lines, there is only one hunt number that everyone dials into to call the office. When this hunt number is dialed, the call goes to the PBX and either to a receptionist or an auto-attendant where the caller is prompted for the person they wish to talk with and their call is transferred to the person. Because of all of this, you need to configure the hunt number as the Auto-Switch Number (*asnumber*) and set the type (*astype*) as No-DID (1), meaning that the Tenor will receive no digits on the inbound call.

When the Origination Tenor is prompted to Auto-Switch a call to the Destination Analog Tenor, it must first communicate, over IP, to the Analog unit that it will send an Auto-Switch Call to it. The Destination Analog Tenor will then set itself in Auto-Switch Mode. Any call that comes in to the Analog Tenor's PSTN ports while it is in Auto-Switch Mode will be run through the Auto-Switch process. If someone else calls in during this time period, the Analog Tenor will attempt to put the call through the Auto-Switch process and wait for a verification code from the Origination Tenor. Since the person calling is not able to send this verification code, they will hear about 1 second of silence. Since the unique Auto-Switch verification code was not received, the Destination Tenor knows that this is not an Auto-Switch call, and will route the call to the PBX, and the caller will hear the ringing of the PBX. When the appropriate call comes in from the Origination Tenor, and the unique Auto-Switch ID code is verified, the Tenors will complete the Auto-Switch. (See next page to review the process in detail)





Analog Tenor Auto-Switch (continued)

1. The call goes over IP, from left to right, just as before, except that our Termination Tenor is Analog, and can't receive DID <Direct Inward Dialing> digits.
2. When the call connects, the Termination Tenor sends its unique Auto-Switch ID# (this time marked as "Non-DID") to the Origination Tenor.
3. Because the Termination Tenor cannot receive DID digits from the PSTN, this time the Tenors will negotiate the Auto-Switch connection, but it is dependant on the IP for a slightly longer amount of time.
 - a. If the IP network TOTALLY and suddenly fails, the call will not be able to be Auto-Switched.
 - b. While users are conversing, the IP network degrades.
 - c. Users may hear noise on call due to IP degradation.
4. When the Packet Loss exceeds the allowable threshold, the Origination Tenor sends a message over IP to the Termination Tenor that an Auto-Switch call is coming.
5. The Termination Tenor then goes into "Auto-Switch mode" for a short period of time.
 - a. The Termination Tenor sees **all** calls coming in from the PSTN as potential Auto-Switch calls.
6. The Origination Tenor dials the Auto-Switch Number.
7. When the Termination Tenor is expecting to receive an Auto Switch-Call, it attempts to verify each incoming call as an Auto-Switch call.
8. When the correct incoming call is verified, the Termination and Origination Tenors communicate with each other on the PSTN channel to confirm the "handoff" of the call, and that IP call has now been patched over PSTN.
9. If an incoming call is verified as a non-Auto-Switch call, the call is routed, as usual, to the PBX. The non-Auto-Switch Caller may hear one second of silence, and then ringing from the PBX.

The call is then switched seamlessly, without any User intervention!

Notes:

- Auto-Switched calls do not get switched back to IP.
- Calls get switched one at a time, not in a block.
- Calls get switched in age order; oldest first.
- The Tenor does not have to wait for first call to drop before switching next call.
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