



Virtual Receiver Concepts

SIMS 2005 User Conference
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Definition of a Virtual Receiver

- Definition of a Virtual Receiver
- Can accept calls from circuits that are not tied to a single phone number.
- Any line card can accept any format.
- Learns via Caller ID or profiles, which handshakes to use for different panels.

Buzzwords

NOTE: All the acronyms referred to in this presentation are also in SIMS Wiki with title “**Commonly used Telephony Acronyms**” (old Tech Note # 040601)if you don't want to write them all down.

Buzzwords

- POTS – Plain Old Telephone Service
 - Standard analog telephone lines.
 - One phone# on one circuit at a time.
- ISDN – Integrated Services Digital Network
 - BRI – 2 data channels, 1 control channel
 - PRI – 23 data channels, 1 control channel
 - All PRI lines in North America are on ISDN but the term “ISDN” usually is only used with BRI circuits.
 - Each data channel can carry separate data/voice from multiple phone numbers and calls.

PRI's & BRI's

- Do not have actual phone numbers assigned to them, instead they use DID numbers (Digital Inward Dial). A single PRI or BRI can have virtually an unlimited number of DID numbers assigned to it.
- When a PRI or BRI circuit “rings” the number that was called is sent to the equipment, like reverse caller-id, called DNIS (Digital Number Identification System).

PRI's & BRI's

- CallerId is only used on POTS lines. On PRI's and BRI's a service called ANI (Automatic Number Identification) is used instead. CallerId is sent after the first ring, whereas ANI is sent before the first ring. This allows receivers to be configured to answer on the first ring and still receive calling party number information.

Termination

- Using PRI's & BRI's you use Channel Banks to configure how inbound and outbound calls are handled. These would be devices like the Adtran Atlas or Carrier Access products. When the phone company installs the circuit they will install a "Smart Jack" that has an RJ45 connector. There is just one connector for the entire circuit. The channel bank connects to that connector.

Typical Configuration

- For alarm receivers, typically an Adtran Atlas 550 is used to convert the PRI into an RBS style T1 with Feature Group D. This Feature set allows the transmission of both DNIS (called number) and ANI (callers number) when configuration in a “Rabbit Hole” configuration

Aren't all T1's PRI's ?

- No. All PRI's are T1's but not the other way around. T1's can also be configured to use RBS (Robbed Bit Signaling) instead of ISDN signaling. When using RBS all 24 channels are available for data and the control information is sent in "robbed bits" from each of the data channels. Instead of each B channel handling 64k of data, they only effectively can use 56k of the bandwidth.

Why RBS vs ISDN ?

- RBS (also called a T1 Voice) is less costly in equipment and circuits. RBS also isn't capable of ANI, DNIS or DID numbers. Each channel is mapped to one and only one phone number on an RBS T1.
- ISDN has a constant control channel and is capable of more advanced features..

So what about virtualization ?

- Hunt Groups were the earliest form of virtualization. The idea is that one number could ring into multiple phone lines allowing more than one call to the same phone number simultaneously.
- Hunt groups really only still allow one call per number because the other lines in the hunt group have their own phone number.

Real virtualization...

- With PRI/BRI lines, when a DID number that is assigned to the circuit is called, if ANY of the channels are available, it will ring through on that channel. Think of it as a “super hunt group” that not only rings to tell you a call is coming in, but now you can tell what number they dialed also.

Acme Central Station

- Currently has 4 phone lines on their receiver, with two hunt groups:
- “555-0001 if busy, rolls to 555-0002
- “555-0002
- “555-0003 if busy, rolls to 555-0004
- “555-0004

Acme Central Station

- If 555-0001 is busy, calls will roll to 555-0002 automatically. If both lines are busy though the calling panel will get a busy signal even though lines 3 and 4 might not be in use at that time.
- Both line 1 and 2 report as receiver/line# 01-01 to the automation software and 3 and 4 report as 01-03. There are no 01-02 or 01-04 accounts.

Now virtualized....

- For the sake of simplicity lets say that Acme Central Station got a PRI line that only has four channels on it (which most telco providers will do). The circuit will be installed with all 24 channels but they would only turn on the channels needed.

Acme

- 555-0001 DID# = DNIS# 0101
- 555-0002 DID# = DNIS# 0102
- 555-0003 DID# = DNIS# 0103
- 555-0004 DID# = DNIS# 0104

Any of the four DID numbers can come through on any of the four channels. So during storms if line 1 gets busy, those signals come through as if there were four lines in that hunt group. Unless all four channels are busy, no calls will get a busy signal. SIMS/CSM then translate the DNIS# into the receiver/line# (passed through or via the DNIS table).

Truth and Lies

- Some people believe that PRI's and other digital circuits are more vulnerable to failures than POTS lines. In essence though the risk is basically the same.
- Digital circuits are treated differently by telco techs than POTS lines and are less likely to be tampered with.
- A 50 pair cable can be cut just as quick as a four pair digital cable or fiber optic cable by a backhoe.
- Fiber Optic cable is typically buried in bright orange plastic conduit, making it easier to spot and it's been buried more recently so records of it's location is generally more accurate.

Truth and Lies

- POTS lines have to be manually rerouted at the local telco office. Digital circuits can be redirected from almost anywhere to almost anywhere.
- Recently, here in Plano, a crew working on a water line cut an underground telephone cable with 3000 pairs in it. 1400 phone lines were out of service for four days. The fiber optic cable right next to the line that was severed was lifted by the backhoe and that is how they realized they had severed the unprotected 3000 pair cable. No T1's were disrupted that were run on that fiber optic cable since it wasn't severed.