



## 4G LTE Internet Failover Test Results

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### Setup:

TruVista 10x1 Cable Modem, Bridge Mode, No Static IP

CradlePoint IBR600 with Voxis 4G LTE Service

- Primary LAN for Computers (No Failover)
- Phone Tagged VLAN with QoS and Failover
- Special Device untagged VLAN with Failover (Credit Card Terminal)

The following phones where tested

Grand Stream: GXP-2100, GXP-2124, GXP-2130, GXP-2140, GXP-2160

YeaLink: T22P

### LAYER 1 Failure

- Computers were unable to access Internet; this was by design to test saving of 4G data
- Active Phone Calls lost audio for 2-3 seconds, the audio resumed, calls do not drop
- New Outbound calls start working 2-3 seconds after fail, the same time it takes audio to come back on live calls
- New Inbound calls take 10-60 seconds, this is because the phone must reregister with PBX on the new Internet connection, inbound calls during this time will go to Voice Mail if setup or Extensions Fall Back Plan if Setup
- Credit Card Machine does report connection error, but immediate retry works

### LAYER 2+ Failure

- Computers were unable to access Internet; this was by design to test saving of 4G data
- Active Phone Calls lost audio for 25-30 seconds, the audio resumed, calls do not drop, however in most cases the remote party did hang up before call resumed.
- New Outbound calls start working 25-30 seconds after fail, the same time it takes audio to come back on live calls
- New Inbound calls take 35-90 seconds, this is because the phone must reregister with PBX on the new Internet connection, inbound calls during this time will go to Voice Mail if setup or Extensions Fall Back Plan if Setup

- Credit Card Machine does report connection error, but immediate retry most of the time, Credit Card Machine will always work if the attempt is 35 seconds after the primary internet failed

## **Fail – Back**

- Computers came back online 60-120 seconds after primary internet was restored
- Active Calls miss no audio and do migrate back to Primary Internet connection
- New Outbound and New Inbound are available throughout migration back to primary internet
- Credit Card Machine sometimes fails with connection error, immediate retry works

## **Other Notes**

- Layer 1 Fail was simulated by pulling Ethernet cable between Cradle Point and Cable Modem
- Layer2 was first simulated by pulling coax from cable modem
- Layer2 was then simulated by false route redirect of 8.8.8.8 (the IP used to monitor)
- Included Cradle Point Antenna's where used
- Building was 1 floor brick with wood roof, with wood stud frame / drywall
- Room device was in was window less
- 4G LTE speeds where very stable @ 25Mb/s X 5Mb/s 90ms round trip to PBX
- 12 concurrent calls where tested live with real lines average MOS score was 4.2
- 32 concurrent calls where simulated average MOS score was 4.1
- 4G connection had a theoretical limit of 160 concurrent calls, however the primary 10x1 can only handle 32 concurrent calls (upload limit factor, 1Mb = 1024K, G.729 = 32K)

## **Customer Expense:**

\$600 – On time device fee

\$150 – per month (Cable Modem with 10x1 \$99.99 + Voxis LTE \$50.00)

Estimated uptime guarantee 99.99%

ROI is 4 months when compared to Wind stream T1 (1.54x1.54) for \$297.00 month