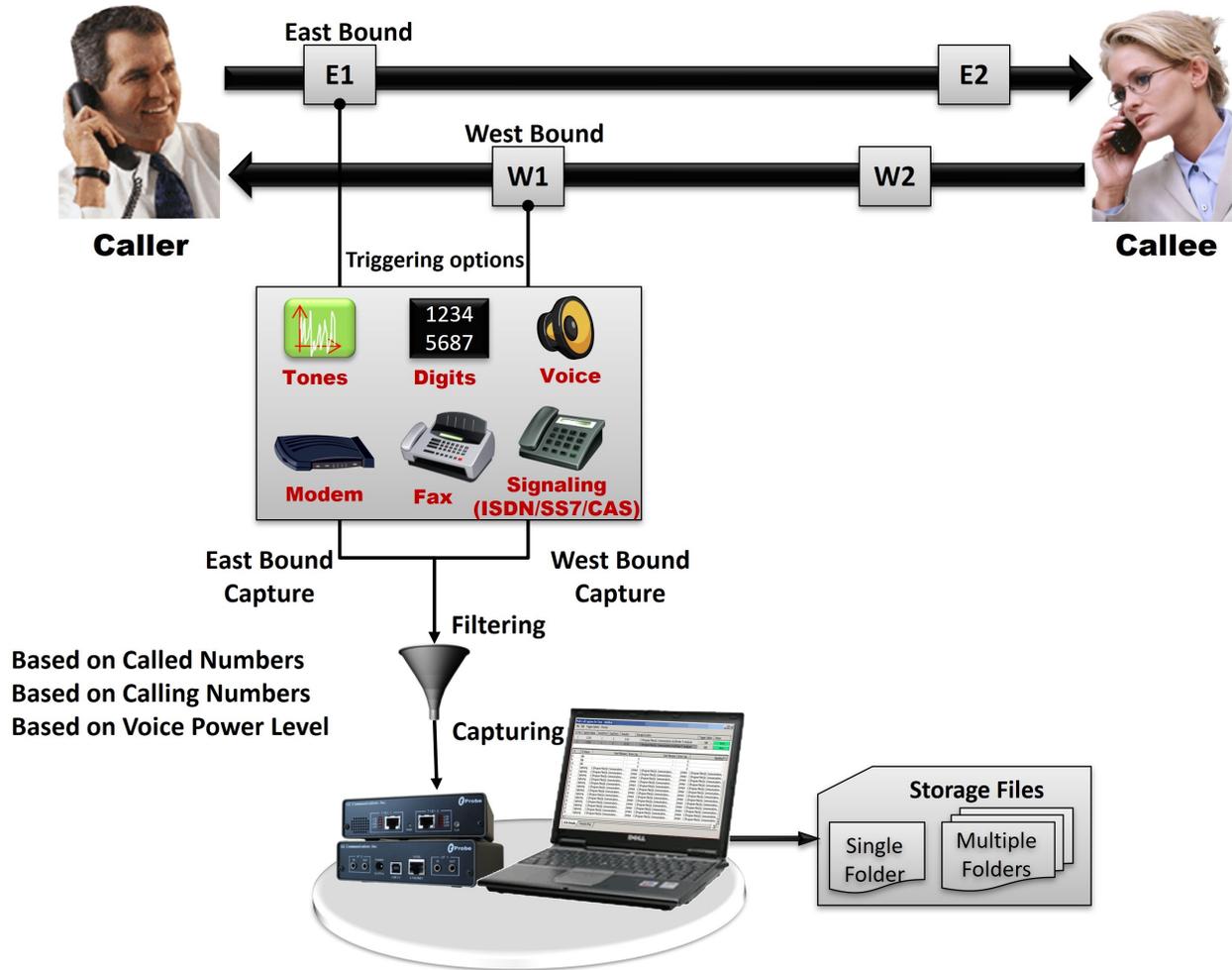


# T1 E1 Call Capture and Analysis



## Overview

The **Call Capture and Analysis (CCA - XX031)** application is used to capture calls directly from the T1, E1, and 2-Wire lines. The system uses T1 E1 Analyzer hardware to interface non-intrusively with T1 or E1 lines. The CCA application is used to initiate recording of calls, either automatically or manually on both East and West directions simultaneously. The auto scanning provides traffic and signaling based triggers. Signaling triggers supports call capture based on ISDN, SS7, CAS (R1, wink start, MFC-R2) messages. The traffic activated triggers supports call capture based on voice, fax, modem, tones, and any traffic with specified power level.

Subsequently, play back the captured calls using a third party audio editing software tools (Adobe Audition/Goldwave) and analyze in time and spectral modes.

When used in conjunction with [Voice Band Analyzer](#) and [Call Data Records](#), the captured signaling and voice can be used to troubleshoot customer complaints of voice call quality, voiceband data, fax quality, and tones and dual tone transmission issues.

For more information, refer to [T1 E1 Call Capture and Analysis](#) webpage.



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## Main Features

### Operating Modes

Ability to capture calls using either Manual Capture mode or Auto Scanning mode.

### Encoding Formats

Supported codecs data rates are - a-law,  $\mu$ -law, 16-bit PCM (Intel), 16-bit PCM (Motorola), MS Wave, G.726 (40 Kbps, 32 Kbps, 24 Kbps, and 16 Kbps), and 14-bit 16 KHz G.722 (64 kbps).

### Captured Results

- Supports capturing ISDN calls with or without NFAS options
- ISDN calls are recorded with CRV, ISDN message type, channel, direction, called and calling numbers
- ISDN calls can be captured with customized called and calling number filter
- All call data are captured including signaling bits, voiceband data, signaling protocol data (e.g. DTMF or MF digits), and various types of traffic such as fax, modem, and voice
- Captured PCM data is saved as two synchronized disk files (east and west directions) for post processing

### Auto ISDN Trigger and Capture Options

- Capture ISDN calls with CRV, ISDN message type, channel, direction, called and calling numbers
- Supports capturing ISDN calls with or without NFAS options

### Auto SS7 Trigger and Capture Options

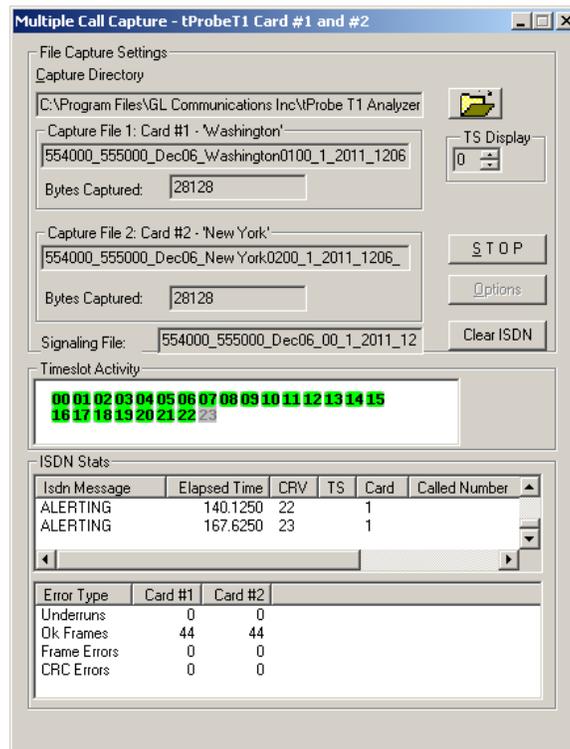
- Detect and capture SS7 calls by defining DPC, OPC, and CIC groups.
- Capture SS7 calls on multiple T1 E1 trunks using a signaling link on a different physical trunk than the telephony circuits

## Applications of CCA

The Call Capture Application (CCA) is used to initiate recording of calls, either automatically or manually. The software has the capability to non-intrusively record calls with signaling and data directly from T1 E1 and 2-Wire lines. Indicated in the figure below are the channels on which ISDN calls are recorded and the files names to which data is stored. Scanning mode is possible wherein all 24 or 30 channels are scanned for call initiation and recording.

Typical applications are:

- Call recording for post analysis
- Call activity, call density, and call volume analysis
- Monitoring and recording Fax, Voice, Modem, ISDN, SS7, and CAS calls
- Filtering of Calls by "called" and "calling" number
- Call activity, call density, and call volume analysis



ISDN Call Capture in CCA

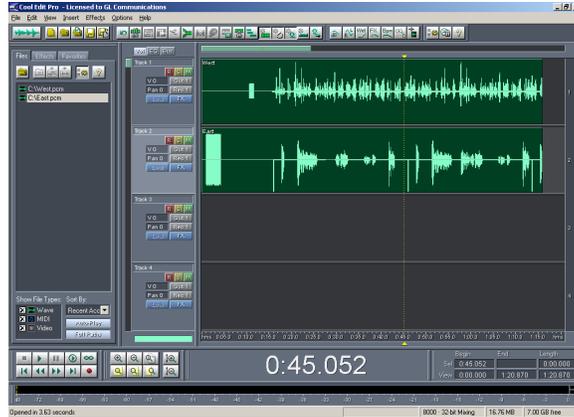
## Call Capture Operating Modes

The options include specifying **Auto-scan** mode or **Manual scan** mode, Start and stop signaling bits for the beginning and ending capture process, Devices, Time limit for recording, Wait for tone, CAS digit parsing, and File naming convention.

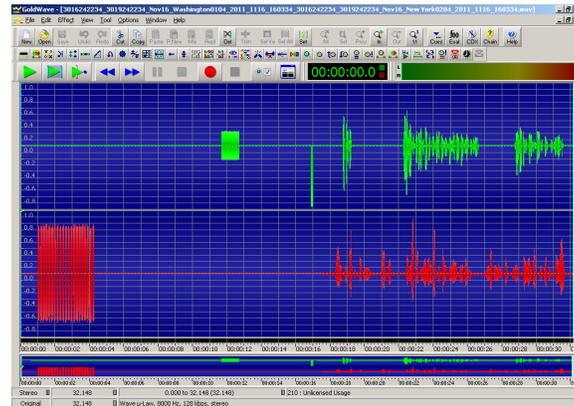
Auto Scanning and Manual Capture are the two basic capture Modes. Different ways to trigger an Auto-Scanning Capture Mode are - Signaling, Tone, Signaling + Tone, ISDN Message, SS7 Message, and Traffic such as fax, modem, voice, and any type of signal with specified power level.

## Oscilloscope (Time) and Spectral (Frequency) Views

There are several methods for viewing captured files supported by various third-party visualization programs such as **Adobe Audition** and **Goldwave** programs. Adobe Audition and Goldwave are used with a variety of file formats including PCM, wav, and others. Adobe Audition and Goldwave can be used to visualize both East and West files. Any of these graphical software programs should be installed in order to directly invoke application.



Adobe Audition Software



Gold Wave Software

## Multiple CCA Application (XX031)

Multiple CCA application is similar to CCA, where in it is used to monitor hundreds of calls, capture the bidirectional data, signaling and traffic, simultaneously from multiple T1 E1 lines, based on the user-defined trigger configurations. Once the capture trigger type is selected, users can control and run multiple capture instances on different T1 E1 ports from a single GUI.

For more information, please visit [T1/E1 Multi Call Capture and Analysis](#) webpage.

CC No	Capture Name	West (Port)	East (Port)	Timeslots	Storage Location	Trigger Option	Action
1	CCA1	1	2	0-10	C:\Program Files\GL Communications Inc\Probe T1 Analyzer	Edit	Abort
2	CCA2	1	2	11-21	C:\Program Files\GL Communications Inc\Probe T1 Analyzer	Edit	Abort

TS	TS Status	West Filename	Bytes Cap...	East Filename	Bytes Cap...	Signaling Fil
0	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
1	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
2	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
3	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
4	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
5	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
6	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
7	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
8	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
9	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
10	Capturing	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...	1023408	C:\Program Files\GL Communications...
11	Idle	-	0	-	0	-
12	Idle	-	0	-	0	-
13	Idle	-	0	-	0	-
14	Idle	-	0	-	0	-
15	Idle	-	0	-	0	-

Multi-CCA Application

## Call Capture in Auto-scan Mode

### SS7 Call Capture Option

In addition to capturing signaling, tone, and ISDN calls, SS7 voice calls capture is also available. SS7 voice calls are kept in CIC groups. When an SS7 call is detected, an Origination Point Code (OPC), a Destination Point Code (DPC), and a CIC # is retrieved. If the comparison holds good capture task is performed, otherwise the call is discarded. CCA also provides the option to map the CICs to the timeslots by either skipping timeslot 16 so it can be used for signaling, or NOT skip channel 16 and map the timeslot to a CIC number.

Call Capture Options

Configuration | **SS7 Options** | Call Storage

Data Rate  
 64 kbps  
 56 kbps

Protocol Selection  
 None

SS7 Call Filtering  
 Call Filtering  
 No Call Filtering  
 Originating Number  
 Destination Number

Signaling Link  
 First Card #  Second Card #  
 Uplink: Card 1 Card 3  
 Downlink: Card 2 Card 4  
 Timeslot #: 16 16

DPC Code  
 OPC: 1 1 1  
 DPC: 2 2 2

Circuit Group Configuration  
 Device Selection: West: Card 1 East: Card 1  
 CIC Start: CIC Quantity:  
 Timeslot Start: 0  
 Skip TS 16  CIC Numbering

T1/E1 #	Start CIC	# of Chan...	Start Timeslot	Skip TS16	Skip CIC
1+2	101	31	1	Yes	Yes

Add CIC

OK Cancel Apply Help

SS7 Options

### ISDN Call Capture Option with NFAS

The CCA triggers ISDN calls capture based on the ISDN messages. Capture occurs after the ISDN message, "SETUP", is detected with the called/calling number that matches the filtering definition for ISDN Call Filtering Options. CCA is also capable of capturing ISDN calls with or without NFAS option. For calls with NFAS, one needs to identify the NFAS interface options (Explicit / Implicit) using the ISDN Analyzer. Once identified, the CCA can be set to capture the ISDN calls on the trunks that contain D-Channel and explicit interfaces using options under NFAS.

Call Capture Options

Configuration | Timeslot Selection | Call Storage | **ISDN Options**

Data Rate  
 64 kbps  
 56 kbps

Inversion  
 Inverted  
 Not Inverted

NFAS  
 NFAS D-Channel  
 D-Chan #  
 Card #1  
 D-Chan #  
 Card #2  
 Explicit Interface  
 Implicit Interface  
 Explicit Interface #:  
 1

Reversed  
 Reversed  
 Non-reversed

ISDN Call Filtering Options  
 Call Filtering  
 No Call Filtering  
 Called Number  
 Calling Number  
 554000

OK Cancel Apply Help

ISDN Options

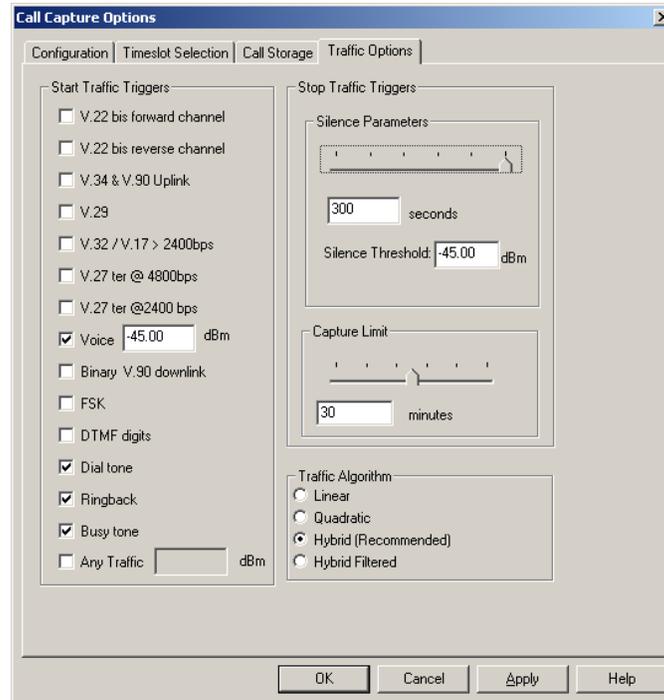
## Traffic Triggered Call Capture

CCA also includes trigger for capturing calls based on various types of traffic such as fax, modem, voice, standard tones, digits, and so on. CCA supports Fax Analysis using GL's [GLInsight™](#) or [GL FaxScan™](#) applications that analyze the saved PCM files, decode fax image as TIFF files and produce detail call logs.

They are V.22 bis forward channel, V.22 bis reverse channel, V.34 and V.90 uplink, V.29, V.32/V.17 > 2400 bps, V.27 ter @ 4800 bps, V.27 ter @ 2400 bps, Voice, binary V.90 downlink, FSK, DTMF digits, Dial tone, Ringback, and Busy tone.

Detecting the above types of traffic requires the use of the traffic algorithms. A 2048 byte (256 ms) block of data is sent to the traffic classifier. The traffic classifier determines if the data is one of the accepted types of traffic. If the condition is met, then capture of the traffic data commences. Additionally, the voice power level can be set to filter out weak or undesirable voice data.

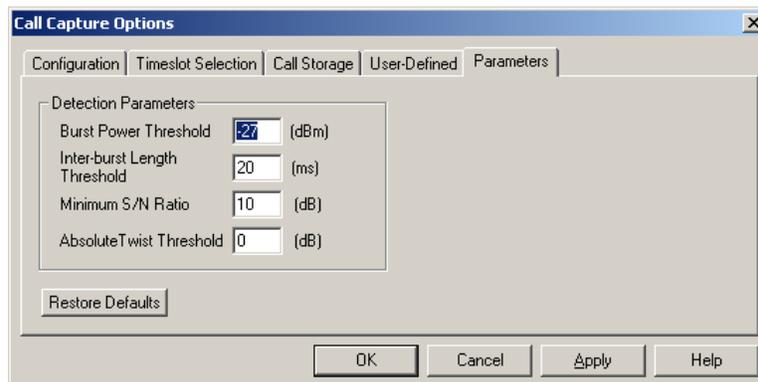
Capture can be terminated either by specifying the silence parameters in seconds or user-defined capture limit time in minutes.



Traffic Options

## Digits, Tones, Signaling Capture Options

User-defined option is available for Tone and Signaling + Tone capture trigger options. This feature allows defining the type of tone(s) that CCA application should detect. The application can only detect single and/or dual tones. Various other options such as Power Threshold, Inter-burst Length Threshold, Absolute Twist Threshold, and S/N ratio can be specified for the tones defined.



Tone Parameters Option

## Call Storage

**File Creation** provides options of stamping captured files sequentially or with the date/time, user-defined direction labels, port/channel, and CRV if applicable. Event Logging allows users to save the call summary records, facility alarms, and supervisory signaling messages as CSV or binary files.

CCA supports creation of subfolders automatically based on the system time and date and user-specified time-period using the Call Storage feature. 'Save Folder' option places all the files captured in a desired directory with the file extension (pcm, a-law,  $\mu$ -law, and others) as specified by the user.

Ex: With '3' as Create New Subfolder Every value, and 'FolderCreatedOn' as Subfolder Name Prefix value, it will create folders every 3 Hours with the system date and time automatically appended to the folder name, for example- FolderCreatedOn0122091808.

## CAS Digit Parsing

The CAS Digit Parser is used to prefix both the called (DID) and calling (ANI) numbers to the filename of the captured calls. CCA has five built-in scripts for commonly used protocols - CAS R1 DID\*ANI, CAS R1 ANI\*DID, CAS R1 DID only, MFR2-176 (CCITT), MFR2-179 (CCITT). It also allows users to select the script of their own choice.

The screenshot shows the 'Call Capture Options' dialog box with the 'Call Storage' tab selected. The 'Capture File Management' section includes a 'Save Folder' field with the path 'C:\Program Files\GGL Communications Inc\Probe T1 Analyzer\ATT'. Below this are 'Subfolders' options: 'Use Subfolders' (checked), 'Subfolder Name Prefix' set to 'device1 capture', and 'Create New SubFolder Every' set to '6' hours. The 'Default Extension' section has radio buttons for 'pcm (.pcm)', 'A-law (.ala)', ' $\mu$ -Law (.ula)', and 'Other'. The 'File Creation' section has radio buttons for 'Date/Time stamp' (selected) and 'Sequential', and checkboxes for 'Use "W" and "E" as Direction Labels in File Names' (unchecked) and 'Use User-Defined Direction Labels in File Names' (checked). A 'Capture Probe Name' checkbox is checked with the value 'TEST'. The 'Event Logging' section has checkboxes for 'Call Summary Records', 'Facility Alarms', and 'Supervisory Signals', all of which are checked. The 'Select Output Format' dropdown is set to 'Csv'. At the bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

**Call Storage Options**

## CCA with other GL applications

### **FaxScan™**

FaxScan™ is GL's command-line Fax decoder/demodulator application used to analyze the recorded voice band traffic (PCM stream and PCAP files) for Fax traffic. It provides analysis of the T.38 packets, T.30 frames, general call-flow indicators and decoded fax image in TIFF-F format.

### **GLInsight™**

The captured files can be analyzed using GL Insight™ Modem and Fax Analysis Software for 2-wire Analog interface.

### **Call Data Records**

Call Data Records is an optional application that produces call summary and call detail reports based on the input event log files (\*\_csr.csv, \*\_fac.csv, \*\_sbf.csv) of CCA.

### **Voice Band Analyzer**

VBA processes the signal files recorded by CCA to monitor voice band network traffic for monitoring speech and noise levels, line echo, and acoustic echo.

## Buyer's Guide

Item No	Product Description
<a href="#">XX646</a>	w/TRAU Tx/Rx Test
<a href="#">XX153</a>	T1/E1 Real-time TRAU Protocol Analyzer, TRAU Traffic Playback, TRAU Toolbox™ Also includes the following: <ul style="list-style-type: none"> <li>• CCA Cable Kit (2 -SA007e Y Bridges, 1 - SA017a &amp; 1 - SA017b Straight &amp; Cross over Cables, &amp; 1 - SA007k Mono to Stereo Miniature Phone Y Cable)</li> <li>• <a href="#">Goldwave Software</a> (SA048)</li> </ul>

Item No	Related Software
<a href="#">CDR032</a>	Call Data Records (CDR) Software
<a href="#">VBA032</a>	Near Real-time Voice-band Analyzer
<a href="#">VQT035</a>	2-wire Voice Recorder
<a href="#">FXT001/</a> <a href="#">FXT002</a>	GLInsight™ Single Fax Analysis – TDM/IP
<a href="#">MDT001/</a> <a href="#">MDT002</a>	GLInsight™ Single Modem Analysis-TDM/IP

Item No	Related Hardware
<a href="#">PTE001</a>	tProbe™ Dual T1 E1 Laptop Analyzer
<a href="#">TTE001</a>	tScan16™ T1 E1 Boards
<a href="#">XTE001</a>	Dual Express (PCIe) T1 E1 Boards
<a href="#">FTE001</a>	QuadXpress T1 E1 Main Board (Quad Port)
<a href="#">ETE001</a>	OctalXpress T1 E1 Daughter boards (Octal Port)

**Note:** PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, refer to [T1 E1 Call Capture and Analysis](#) webpage.



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