

Call Progress Analysis Overview

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Introduction

This document discusses Call Progress Analysis (CPA), the new digital signal processor (DSP) algorithm that analyzes the time-division multiplexing (TDM) voice stream to look for special information tones (SITs), fax/modem tones, human speech, and answering machines.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

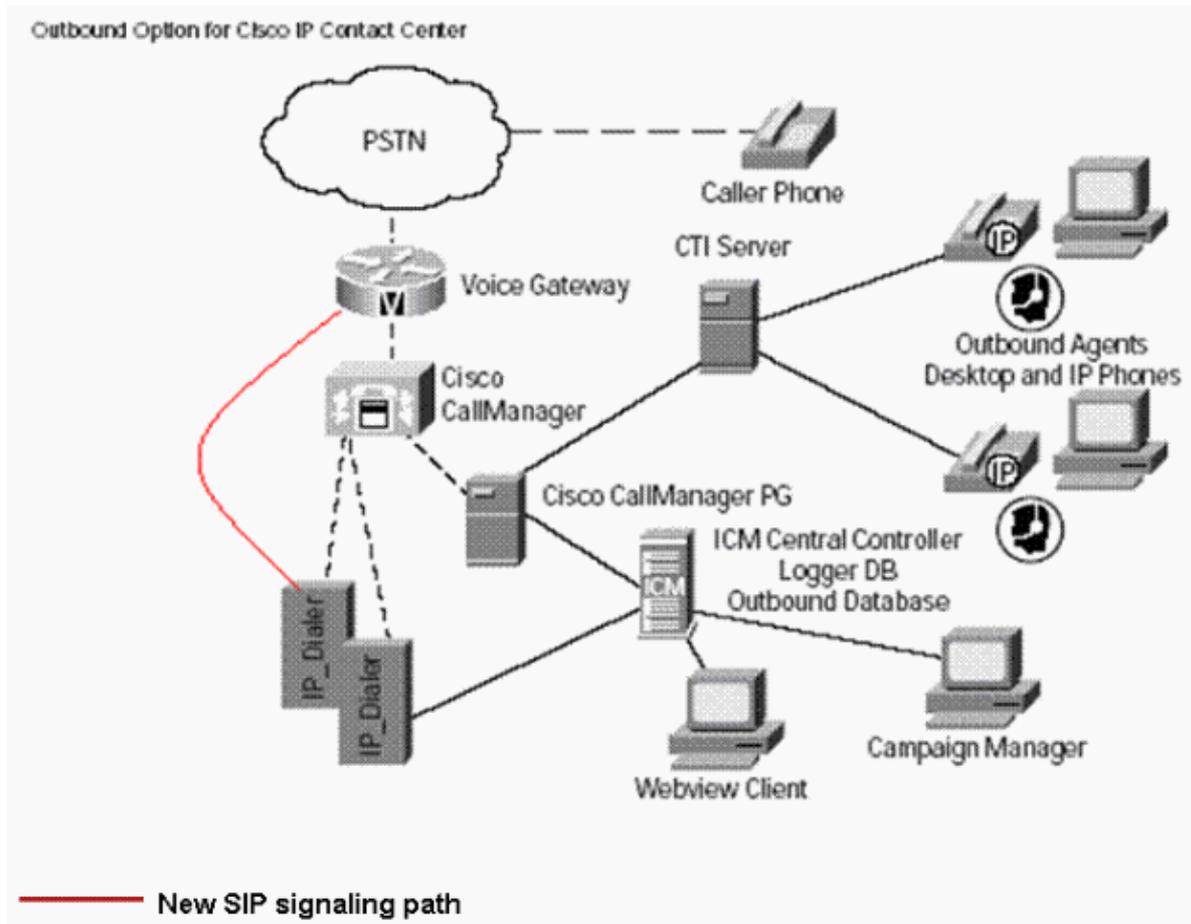
Refer to Cisco Technical Tips Conventions for more information on document conventions.

CPA Software Overview

Call Progress Analysis (CPA) is the new DSP algorithm that analyzes the TDM voice stream to look for SITs, fax/modem tones, human speech, and answering machines. CPA also passes information to Cisco IOS®.

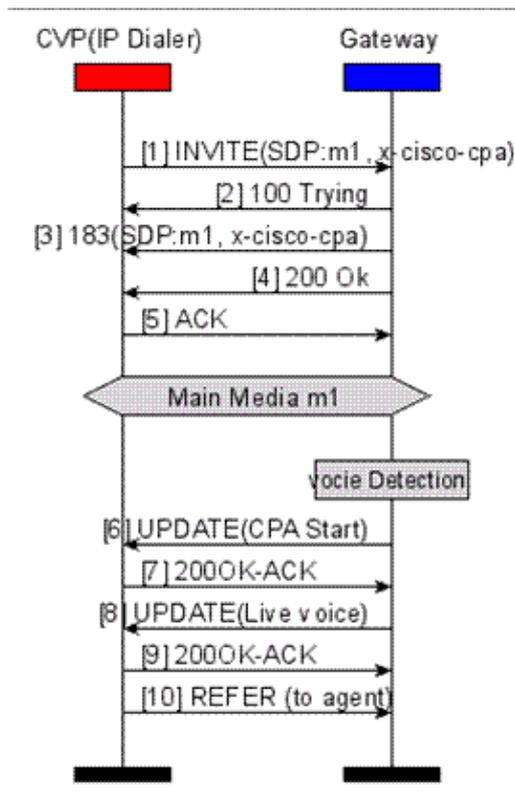
There is a new SIP application type, **x-cisco-cpa**, for callers to request a CPA operation and for the gateway to relay information to the caller. CPA is supported only on the TDM gateway where one of the call legs is terminated.

CPA is initiated when SIP INVITE is sent with x-cisco-cpa application/content body. While the call is in progress, DSP analyzes the incoming voice stream. DSP identifies the type of voice stream based on statistical voice patterns or specific tone frequencies. The gateway sends SIP UPDATE with x-cisco-cpa, which contains the CPA result. Based on this CPA result, the caller decides the next step, such as to transfer the call or terminate the call. CPA does not interfere with the existing SIP protocol.



Typical CPA call flow

This diagram depicts the typical CPA call flow.



New x-cisco-cpa application body

These are the application bodies for the new x-cisco-cpa:

- Within SIP INVITE **Dialer > Cisco IOS**: Tells Cisco IOS to activate the CPA algorithm for this call.
- Within SIP 18x **Cisco IOS > Dialer**: Tells the Dialer whether or not CPA is enabled for this call.
- Within SIP UPDATE **Cisco IOS > Dialer**: Tells the Dialer the CPA result.

New x-cisco-cpa application body in SIP INVITE

```

--uniqueBoundary
Content-Type: application/x-cisco-cpa
Content-Disposition: signal;handling=optional
Events=FT,Asm,AsmT,Sit
CPAMinSilencePeriod=<int16>
CPAAnalysisPeriod=<int16>
CPAMaxTimeAnalysis=<int16>
CPAMinValidSpeechTime=<int16>
CPAMaxTermToneAnalysis=<int16>
--uniqueBoundary--
  
```

New x-cisco-cpa application body in SIP 18x

```

--uniqueBoundary
Content-Type: application/x-cisco-cpa
Content-Disposition: signal;handling=optional
event=enabled
--uniqueBoundary--
  
```

New x-cisco-cpa application body in SIP UPDATE

```
Content-Disposition: signal;handling=optional
Content-Type: application/x-cisco-cpa
CSeq: 102 UPDATE
Max-Forwards: 70

event=detected
status=FT
```

CPA parameter set

This table shows the CPA parameters, their default value, the definition of each parameter, and the method by which each parameter is configured.

Name	Default Value (units)	Definition	Configured via
CPAMinSilencePeriod	375 (mS) 177hex	Amount of time that the signal must be silent after speech detection to declare a live voice.	SIP/CLI
CPAAnalysisPeriod	2500 (mS) 9C4hex	Amount of time (from the moment the system first detects speech) that analysis will be performed on the input audio.	SIP/CLI
CPAMaxTimeAnalysis	3000 (mS) 8BBhex	Timeout if no detection.	SIP/CLI
CPANoiseThresholdPeriod	100 (mS) 64hex	Amount of time that the CPA algorithm uses to compute the noise floor,	CLI
CPAMinimumValidSpeechTime	112 (mS) 70hex	Amount of time that energy must be active before declared speech. Anything less is considered a glitch.	SIP/CLI
CPAMaxNoiseFloor	10000	Maximum noise floor	CLI
CPAMinNoiseFloor	1000	Minimum noise floor	CLI
CPAActiveThreshold	32 (dB) 20hex	Signal must exceed CPAActiveThreshold*noiseThreshold to be considered active. For example 32 is $10 * \log(32) = 15$ dB	CLI
CPASilenceDebouncePeriod	112 (mS) 70hex	Amount of time that signal is 'debounced' before moving to the silence state.	None
CPAMaxTermToneAnalysis	15seconds 3A98hex	Analysis period for Term Tone Detection	SIP/CLI

CPA CLI

All the CPA related CLI commands need to be configured under the `voice service voip` mode. In order to enable CPA support in the global gateway configuration, enter this CLI command:

```
[default | no] cpa
```

These are the commands used to configure various CPA parameters through the CLI:

Note: Values in x-cisco-cpa body overwrite CLI values.

```
cpa timing live-person
    cpa timing timeout
    cpa timing term-tone
    cpa timing silent
    cpa timing valid-speech
    cpa timing noise-period
    cpa threshold active-signal
    cpa threshold noise-level min
    cpa threshold noise-level max
```

This is an example for the CPA configuration through the CLI:

```
#
```

```
!  
voice service voip  
  cpa  
  cpa timing silent 375  
  cpa timing live-person 2500  
  cpa timing timeout 3000  
  cpa timing noise-period 100  
  cpa timing valid-speech 112  
  cpa timing term-tone 15000  
  cpa threshold noise-level max -50dBm0  
  cpa threshold noise-level min -60dBm0  
  cpa threshold active-signal 15db  
!
```

In order to debug the CPA configuration, issue these commands in order to capture useful information:

- `show call history voice`
- `show call active voice`

Additional debug information can be collected with the following commands and the PCM capture:

- `debug voip hpi all`
- `debug ccsip messages`

Related Information

- [Voice Enhancement Features for Cisco IOS Release 12.4\(24\)T Cisco IOS Release 12.4 Command References](#)
- [Technical Support & Documentation – Cisco Systems](#)

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