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# Computer Telephony Application Development Environment (CT ADE)

## Development Tool for Building Robust, Portable Computer Telephony Applications

The Computer Telephony Application Development Environment (CT ADE) from Intel is a set of development tools and run-time environments that help shorten your time to market—and your time to revenue—by allowing you to build robust, portable CT applications quickly and easily.

CT ADE reduces the need to write directly to a telephony device's application programming interface (API) in C or C++. Because of its underlying architecture, CT ADE eliminates the need for developers to learn new telephony hardware, APIs, and protocols. The CT ADE architecture provides an abstraction layer that sits on top of telephony device APIs and performs low-level CT tasks, saving time that you can use to focus on building innovative applications.

CT ADE offers you the flexibility to program in the environment you choose. You can build computer telephony applications in a CT-specific environment or a Windows* environment. Both interfaces give you access to the many benefits of the underlying architecture. You can use CT ADE's application development (AD) language, which is a CT-specific scripting language that includes a flowcharter and a debugger. If you prefer a Windows visual development language like Visual Basic*, AD ActiveX* objects incorporate directly into a visual programming environment, providing CT-specific development functions.

### Features and Benefits

Facilitates development
— Enhance your applications with powerful computer telephony (CT) features — no CT expertise required

Shortens the development cycle
— Alleviates the time-consuming and often repetitive coding required by different APIs

Improves return on investment by letting you write applications once and deploy them on a variety of popular API or trunk types, in any country, with minimal changes
— Provides application programming interface (API) and trunk transparency

Combines flexibility and power
— Choose your programming environment while you benefit from the power of the underlying architecture

Lets you deliver new speech-based telephony solutions and meet the growing demand for solutions such as voice portals and call assistants
— Provides native support for speech recognition engines—including Nuance*, Philips* SpeechPearl*, SpeechWorks*, and Microsoft SAPI

Enables the development of applications that can be used worldwide
— Supports 15 languages including English, French, Dutch, Spanish, Mandarin, and Cantonese
— Supports regional language differences such as British and American English, and Latin American and Castilian Spanish

Either environment gives you a specialized platform that reduces the repetitive tasks associated with traditional telephony application development—enabling you to stay focused on the most profitable aspects of developing your application.

## Enjoy Hardware, API, and Network Transparency

The CT ADE resource manager is object-oriented and mediates between telephony commands and underlying telephony hardware resources. With the CT ADE resource manager, you write your applications only once, even though they will operate with a wide range of telephony hardware, device APIs, and telephone network protocols.
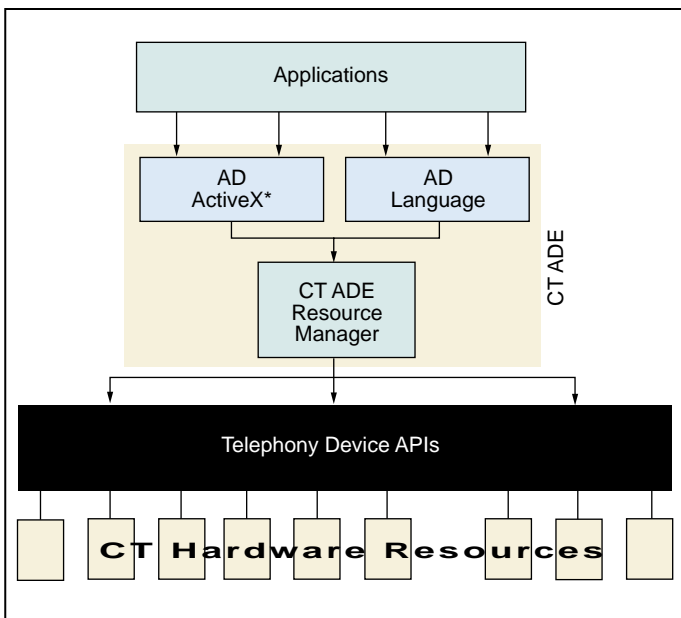


*Figure 1. The Computer Telephony Application Development Environment (CT ADE)*

The transparency that the CT ADE resource manager provides will allow the same set of application functions to work, usually without modification, under all supported telephony APIs and all supported trunk types—including analog loop start, T-1 E&M, E-1/R2, and PRI. Before the introduction of the CT ADE resource manager, you had to write different applications or include conditional logic to handle a range of telephony hardware, APIs, and environments.

When you use CT ADE, you only need to learn a single set of easy-to-use commands, regardless of the hardware, API, or network protocol in your solution. For example, if you invoke the VOS function **TrunkAnswerCall,** the CT ADE resource manager determines which kind of telephony trunk interface you are using and which API function must be used to manipulate it: **dx_sethook** (R4 analog) or **gc_Answer** (R4 PRI). Intel is committed to keeping applications using the CT ADE resource manager portable to different APIs and trunk types as the industry evolves and programming needs change.

CT ADE functions are simple to use, easy to learn, and consistent. Typical application functionality, such as initiating or receiving calls or playing menus and prompts, is easy to create and maintain. You are freed from the time-consuming and often repetitive coding required by different APIs including:

• Driver initialization

• Resource allocation at open and close

• Complex API function signatures such as handles, bit-fields, pointers, and structures

• Asynchronous event handling such as callbacks and messages

• Determination of installed hardware and trunk configuration

## Applications

• Voice portal

• Voice messaging and unified messaging

• Voice-activated dialing (VAD)

• Text-to-speech email

• Speech-enabled interactive voice response (IVR)

• Contact center

• Customer relationship management (CRM)

• Fax-on-demand

• Debit card

• And many others

## Choose Your Programming Environment

CT ADE is flexible, allowing you to program in your environment of choice. Build CT applications in a Windows development environment, or choose a CT-specific development environment.

### AD ActiveX Objects

Web and PC developers less familiar with computer telephony can benefit from new market segment opportunities by adding CT features to their existing applications with powerful AD ActiveX objects. These objects seamlessly integrate into familiar visual programming environments like Delphi*, Visual Basic, and Visual C++*. They can be added directly into your existing "visual" development environment, making it easy to develop robust CT applications. AD ActiveX objects include:

- Voice
- Fax
- Conference
- Text-to-speech
- Speech recognition

### AD Language

Developers who are more experienced with CT may want to use the AD language programming environment with its debugger and flowcharter.

The AD language is a highly efficient, telephony-specific scripting language similar to C or C++. An application with only 14 lines of AD language code (or three flowcharter icons) can require more than 500 lines of C or C++ code. Designed specifically for Intel® Dialogic® hardware and telephony development, the interpreted AD language is compiled to P-code. It allows all available hardware ports to run on a single thread (Windows 2000*). It also enables extremely high performance since it is optimized to eliminate overhead compared to most multi-threaded C or C++ applications.

The flowcharter speeds up building telephony applications by anticipating your next action and dramatically reducing mouse moves, drags, and drops. The flowcharter is an icon-based graphical user interface (GUI) built on top of the AD language. The icons generate AD language code for basic telephony functions. You can also create custom icons using AD language script or C/C++.

One key advantage of the AD language is the ability to build high-density applications with as many ports per PC as the current hardware will support. Industrial strength, highly reliable, and extremely flexible, the AD language also supports a broad range of telephony technologies that provide the same low-level control as writing directly to the board API in C or C++.
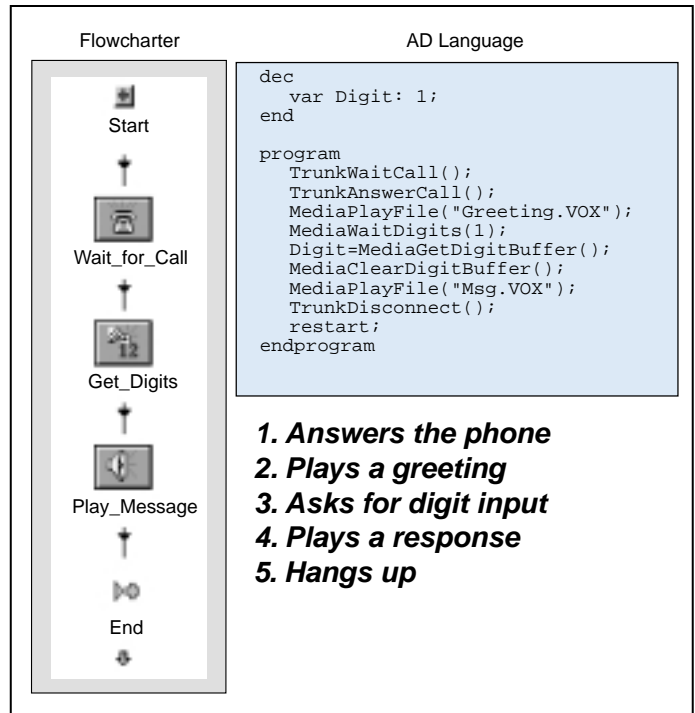


*Figure 2. A sample application in the AD language*

## Speech-Enable Existing Applications

Demand is growing for a new wave of speech-based telephony applications such as voice portals and personal call assistants. If you want to meet this new demand quickly, you need an intuitive way to speech-enable your applications. CT ADE can help by offering native support for leading speech recognition engines including Nuance, Philips, SpeechWorks, and Microsoft SAPI. If you use one of these engines, you can call functions directly from applications built with CT ADE. CT ADE also allows you to make the most of advanced hardware features such as Continuous Speech Processing (CSP).

## Test Solutions with the Simulated Phone Feature

The simulated phone is an application that simulates a telephony board. You can use it to develop, test, and demonstrate your applications — even if there is no telephony board in your computer. The simulated phone uses a WAVE-compatible

soundboard to play voice messages, a microphone for recording (if your application needs to record messages), and a keyboard or mouse to enter digits to simulate a touch-tone phone.

## Go to Market Faster with Training and Consulting Services

Get up to speed quickly with CT ADE by taking the CT ADE training class for application developers. Regularly scheduled at locations around the world, the class can enhance your CT ADE skills and help you go to market faster by streamlining your development efforts. For more information, visit http://www.intel.com/network/csp/resources/ news_events/edu/7740web.htm.

To help your development team understand CT technology and incorporate it into your application, Intel offers CT ADE Jumpstart Service. This accelerated consultative program creates a framework design for your intended application. You and your developers can use this framework to complete the product. Contact Intel for details by calling 1-800-755-4444 and asking for sales, or visit http://www.intel.com/network/ csp/products/7623web.htm.

## Get Started Now With a Complimentary Evaluation Version

Download a complimentary CT ADE Evaluation Version and test all the functionality of CT ADE. Applications developed using the evaluation kit run on simulated phone resources. The download for the CT ADE Evaluation Version is at http://www.intel.com/network/csp/products/ctade/ evalsw.htm.

# Technical Specifications**

## System Requirements
CT ADE is designed and tested for the Windows NT* and Windows 2000* operating systems.

## Supported Technologies

**Intel Technologies**

- Transparent support for R4 API and Global Call
- Support for all technologies supported by Global Call, including SS7
- Available for System Release 5.1

**Trunks**

- Analog trunks (using ag_ and dx_ APIs)
- Analog and digital trunks (using the Global Call API)
- MSI stations (using the ms_ API)

**Media**

- Intel Dialogic media resources using dx_ API
- Windows WAVE devices using Win32 WAVE API

**Fax**

- VFX/40 fax (using the fx_ API)
- CPi fax (using the GammaLink API)
- DM fax (using the GammaLink API)

**Conferencing**

- MSI conferencing (using the ms_ API)
- DCB conferencing (using the dcb_ API)

**Voice Recognition**

- Microsoft SAPI 5.0 Automatic Speech Recognition*
- SpeechWorks Voice Recognition* v6.5
- Nuance Voice Recognition* v7
- Philips SpeechPearl 2000 Voice Recognition*

**Text-To-Speech**

- Microsoft SAPI 5.0 Text-To-Speech*
- SpeechWorks Speechify* v6.5
- Nuance Vocalizer* v1.0
- L&H* RealSpeak* v3.0

**Other**

- ADO RLL for accessing databases
- ATM RLL for routing resources among PCs
- NetHub RLL for sharing data among PCs

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