:CRQ™ Plug-in Developer's Guide

Version 1.0

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1 Overview of :CRQ™ Function

:CRQ™ is a system of technology that enhances and accelerates an Internet user's access to information by providing a mechanism that translates a code (obtained from a product code reader or an audio decoding device) into a URL that can be viewed in the user's Web browser. A **:CRQ plug-in** is a method for customizing the behavior of the :CRQ technology to suit a particular purpose.

1.1 Normal Function

Without a plug-in activated, the normal sequence of events begins with a code scan (such as the UPC symbol on a can of peas, or a Digital:Convergence™ cue in a newspaper) or audio cue arrival. As shown in Figure 1, the :CRQ desktop application transmits the product code or cue value and the type of code to the Digital:Convergence Transaction Engine, where the code is looked up in the cue database. If the code is found, the URL associated with that specific code is returned to the user's computer, where it may be passed to a Web browser for viewing.

In summary, in normal operation with no plug-in active, each cue or product code can launch a specific URL unique to that code.

Normal Cue and Product Code Data Flow

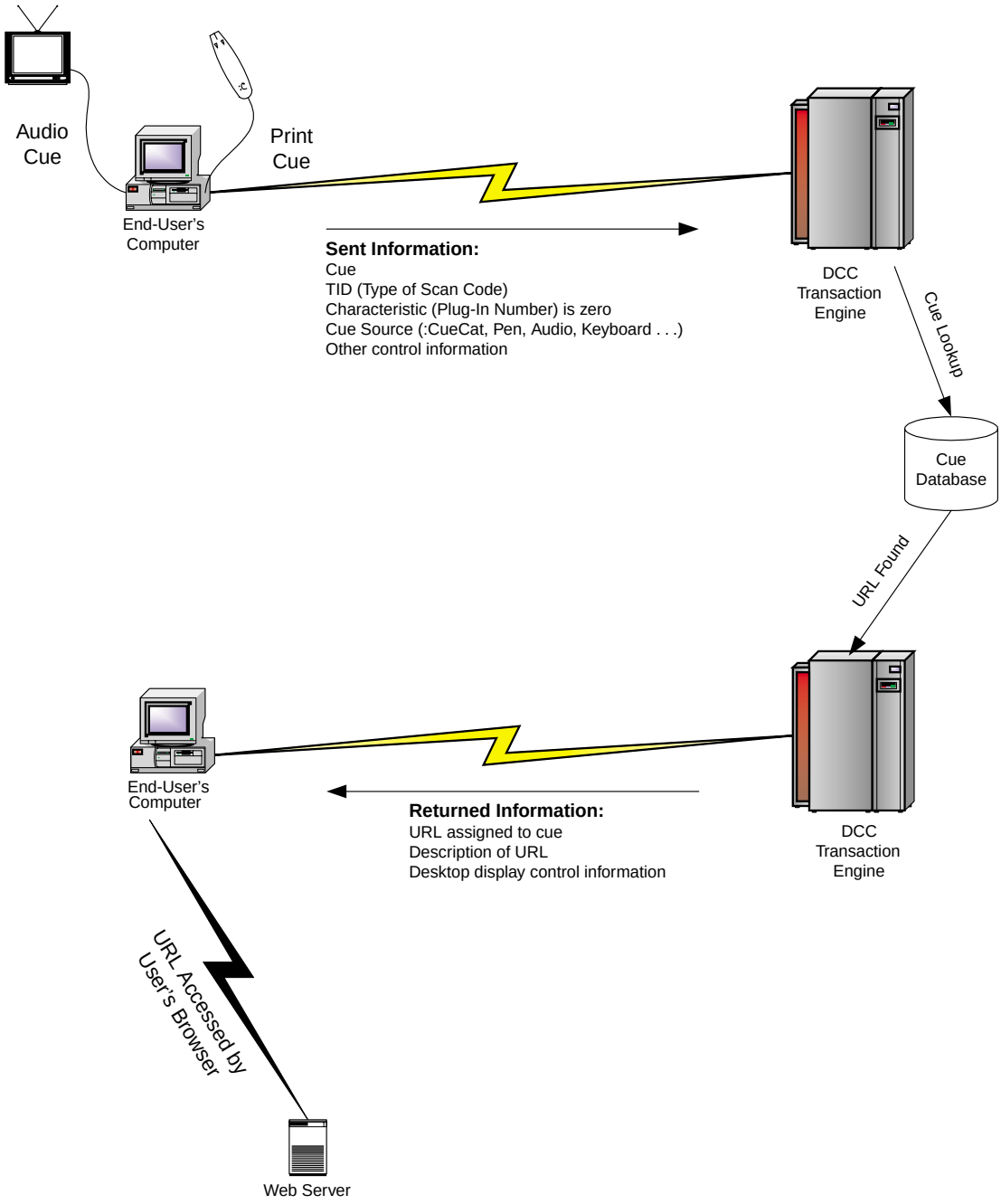

Figure 1: Normal Cue and Product Code Data Flow

1.2 Plug-in Function

If a product code swipe or audio cue event occurs while a plug-in is active in the user's :CRQ desktop application, the final result is different. As shown in Figure 2, the :CRQ desktop application transmits the plug-in's unique identifier to the Transaction Engine to denote an active plug-in. The Transaction Engine then looks up the plug-in rather than the cue code or product code, and returns the URL associated with the plug-in to the user's computer.

In most cases, the URL returned will have one or more pieces of information inserted in it in places defined by the plug-in's developer. These insertions communicate the actual code value and code type to the destination Web page to which the URL points.

Example:

A developer creates a "Household Inventory" plug-in so that when a product bearing a UPC product code is swiped with a :CueCat reader, the scan code is added to a list maintained by a CGI script on the developer's Web server at www.example.com. With the plug-in active, the end result when the user scans a product with UPC 12345678 is that the user's browser sends

http://www.example.com/inventory/cgi-bin/list.pl?code=12345678&action=ADD

to the server. The code on the destination Web server handles the details of processing the scanned code. All supported scanners follow this same sequence for single codes, no matter which scanner is used by the end-user.

Plug-in Cue and Product Code Data Flow

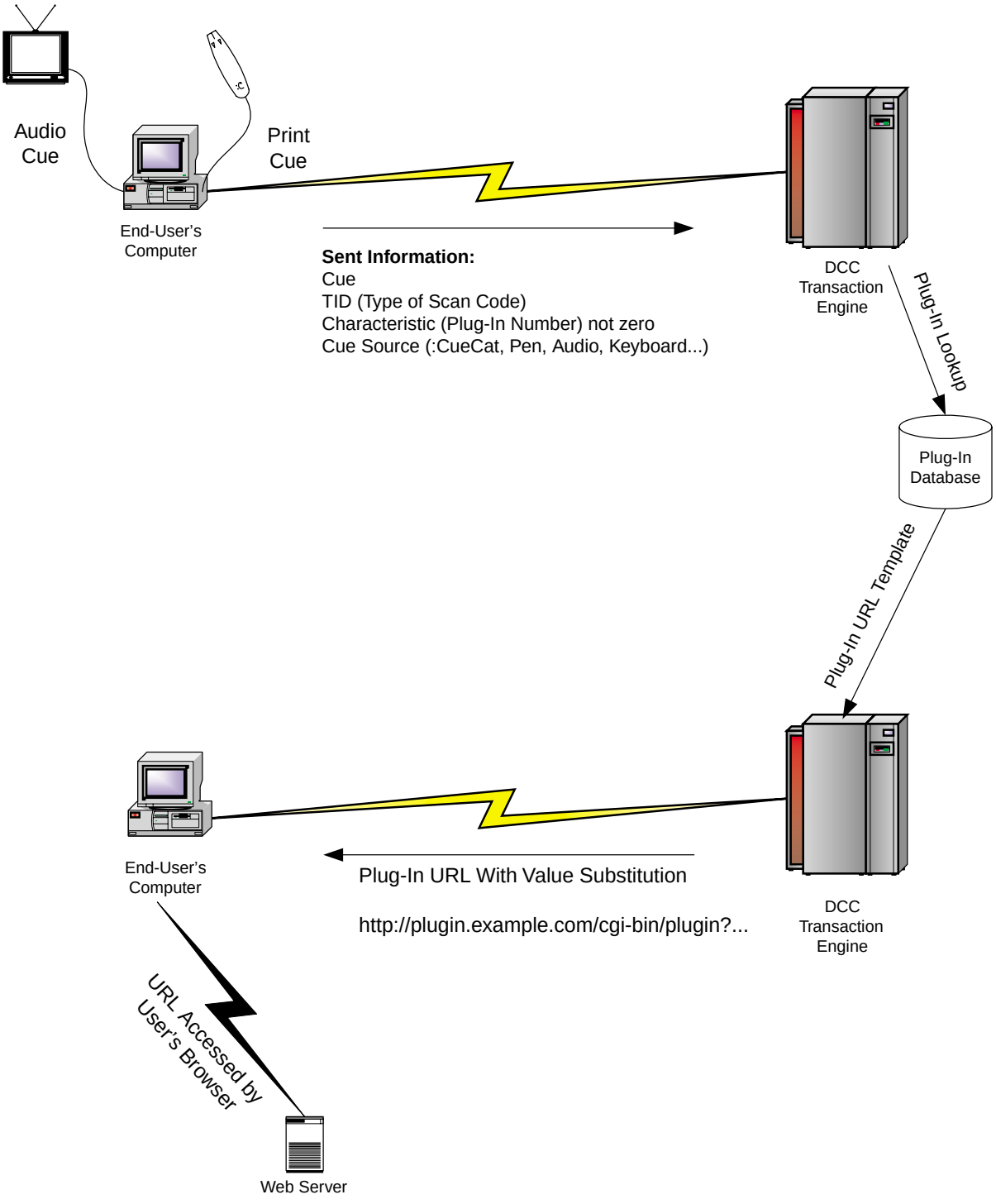

Figure 2: Plug-In Cue and Product Code Data Flow

2 Anatomy of a Plug-in

A functioning :CRQ plug-in comprises the following elements:

On the user's computer:

- The :CRQ desktop application, version 2.2 or later.
- The plug-in activation data set, which takes the form of a named section within the **plugins.ini** file in the :CRQ installation folder.

On the Digital:Convergence Transaction Engine:

- An entry in the :CRQ Plug-in Registration Table, containing the plug-in's URL template and other control information.

On the destination Web site:

- A collection of Web pages, scripts, and programs necessary to process the browser messages (URLs) created by cue or scan events at the user's computer.

3 Plug-in Distribution

Once a plug-in has been created and registered with Digital:Convergence, it needs to get into the hands of its intended users. The basic mechanism for sending the ability to use a plug-in to a computer is to transfer a small file containing the plug-in's control information to the destination computer. There are two basic categories of distribution mechanism: **Private** and **Public**. The category into which a given plug-in is placed is determined by the developer and communicated to Digital:Convergence at the time of plug-in registration.

3.1 Private Distribution

Your plug-in may be for personal use, for your family and friends, or in the case of a commercial-use plug-in, for your company or your company's customers.

Private distribution is accomplished by sending the plug-in's **DCP** file to the destination computer. This may be done by e-mail attachment, download from a Web page, diskette, or by any other practical means for sending small text files.

The **DCP** file is generated by Digital:Convergence at the time the plug-in is registered, and is sent to the plug-in developer as part of the registration acknowledgement e-mail message. It can be used to enable the plug-in in a number of ways:

- Use the "Launch Attachment" feature of an e-mail client—:CRQ uses this event to install the plug-in.
- Save the file to a handy disk folder and double-click the file's icon using Windows Explorer.
- Copy the file to the :CRQ installation folder—:CRQ detects the file and install the plug-in automatically the next time :CRQ is launched.

3.2 Public Distribution

If your plug-in is suitable for use by the general public, it can be included with the list of plug-ins that is available to :CRQ users using the **Get New Plug-ins** command in the :CRQ Options > Plug-ins menu.

4 Creating Your Plug-in

A :CRQ plug-in is like any other application system: to be successful, it must start with a well-thought-out concept that is then embodied in a framework of effective software and user interface elements.

4.1 Design the Web Application

We can't offer a tutorial on effective Web application development here—that topic is much better covered in the many publications available elsewhere. However, a few items are helpful to keep in mind:

- Once a user activates your plug-in, all subsequent code events (product code swipes, audio cues, keyboard code entries) invoke your plug-in's URL template, which in turn activates the code on your Web site specific to your plug-in. A swipe of a product code with a :CueCat reader might be equivalent to clicking an "Add this item to shopping cart" button on a Web form, or some other action specific to a particular coded item.
- No assumptions about what Web pages the user has visited (or even that a browser is active at all) can be made. Consequently it may be necessary to use mechanisms such as session cookies.
- Make sure your plug-in handles exceptions appropriately. All codes will be sent to your site when your plug-in is active. Be sure to test for range and overflow conditions.

4.2 Specify the Plug-in URL Template

The URL generated by a user desktop code event consists of two kinds of data: the **static** data, which is constant from event to event, and the dynamic data, which is specific to each event. You embed the dynamic data within the URL by means of **token substitution**. The format and content of the tokens are detailed in Section 5.1. The example line below shows how a template URL is constructed:

```
http://example.com/cgi-bin/lookup.pl?code=@code@&tid=@tid@&act=find
```

Here the dynamic data is substituted in the place of the tokens `@code@` and `@tid@`. If a user swipes the product code on a can of screen cleaner with your plug-in active, your Web application's CGI receives "`code=01769312163&tid=UPA&act=find`" as a result.

4.3 Register Your Plug-in

When you are ready to begin testing your plug-in using the Transaction Engine, you must register it with Digital:Convergence. The details of the procedure are posted on the Developer Information page at http://www.crq.com/developers.

If you intend your plug-in for public distribution, you may wish to register it as a private plug-in for testing until you are confident that it is functioning correctly.

4.3.1 The Developer License Agreement

A copy of the Limited Private Developer License Agreement for non-commercial plug-ins is included at the end of this document.

If your plug-in is not for commercial purposes (that is, the natural result of a plug-in transaction is not a monetary exchange, regardless of who benefits), then you should read and agree to the Limited Private Developer License Agreement.

If your plug-in has a commercial application, a Commercial Plug-in License Agreement must be negotiated between you and Digital:Convergence. Contact plug-ins@digitalconvergence.com to begin this process.

4.3.2 The Registration Request

When you are ready to begin testing your plug-in using the Digital:Convergence Transaction Engine, follow the registration procedures on the Digital:Convergence Plug-in Developer Information page. If you intend your plug-in for public distribution, you may wish to have it registered with private distribution until you have tested it thoroughly and are confident that it is ready for public release.

4.3.3 The DCP File

When Digital:Convergence Plug-in Registration is complete, you receive notification by e-mail containing a recap of the registration information as it appears in our databases, and a copy of your plug-in's DCP file. The DCP file allows you to activate your plug-in on your local desktop, and can also be used to distribute your plug-in to others.

4.4 Test Your Plug-in

Once your plug-in has been registered, you can test the behavior of your Web code with real-life data. You may wish to test its reaction to a wide variety of different sorts of code input, especially if you intend it for public distribution.

4.5 Distribute Your Plug-in

If you intend your plug-in for public distribution, update the registration information to make the plug-in publicly available. The plug-in may also be made available directly to people by sending them the DCP file.

5 Reference Information

5.1 Plug-in URL Template Format and Variable Substitution

This section describes the elements of the Plug-in URL template that resides on the Digital:Convergence Transaction Engine and is used to construct the URL that is launched by the plug-in user's browser. See Section 4.2 above for a general discussion of URL templates.

5.1.1 Substitution Token Format

The general format of the token data substitution in the plug-in URL is ***@name@*** where *name* is one of the tokens listed below. ***NOTE: Token names are all lower case.***

5.1.2 Substring Selection

It may be necessary to extract some substring of the actual data item. Substring selection may be done using the format ***@name,start,end@*** where *start* is the first character to be used (the first character is character zero) and *end* is the last character to be used. So if the value of @code@ is "01234567" then the value of @code,1,5@ is "12345".

5.2 Token List

- **@code@** -- substitute the literal code value of the print cue, product code, or audio cue.
- **@tid@** -- substitute the TID (type identifier) string, which defines the type of code you are processing.
- **@cuesource@** -- substitute the string that identifies what sort of device was used to capture the code.

5.3 @tid@ (code Type IDentifier) Code List

The following list describes the various types of codes supported by the :CueCat reader.

Digital:Convergence :Cue ("Slant128")

TID: **CC**x

Note: "x" is the Code B output representation of the start character that was used. For example, if Value 86 is used as the start character, the TID would be CCv. If Value 5 is used as the start, the TID would be CC%.

Codabar

TID: **CBR**

Character set: 0123456789-:$/+.

Size: arbitrary length

Check digit(s): none

Code 128

TID: **128**

Character set: full ASCII

Size: arbitrary length

Check digit(s): yes, but not human readable

Code 39

TID: **C39**

Character set: 0123456789,.$/+%* and space

Size: arbitrary length

Check digit(s): none

EAN

TID: **E13**

Character set: 0123456789

Size: 13 digits

Check digit(s): EAN algorithm, 13th position

TID: **E32**

Character set: 0123456789

Size: 15 digits

Check digit(s): EAN algorithm, 13th position

TID: **E35**

Character set: 0123456789

Size: 18 digits

Check digit(s): EAN algorithm, 13th position

TID: **E08**

Character set: 0123456789

Size: 8 digits

Check digit(s): EAN algorithm, 8th position

TID: **E82**

Character set: 0123456789

Size: 10 digits

Check digit(s): EAN algorithm, 8th position

TID: **E85**

Character set: 0123456789

Size: 13 digits

Check digit(s): EAN algorithm, 8th position

ISBN

TID: **Hand entered only**

Character set: 0123456789Xx

Size: 10 digits

Check digit(s): ISBN algorithm, 10th position

TID: **IBN**

Character set: 0123456789

Size: 13 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first three digits are 978 or 979

TID: **IB2**

Character set: 0123456789

Size: 15 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first three digits are 978 or 979

TID: **IB5**

Character set: 0123456789

Size: 18 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first three digits are 978 or 979

ISSN

TID: **Hand entered only**

Character set: Assumption 0123456789Xx

Size: 8 digits

Check digit(s): Assumption ISBN algorithm, 8th position

TID: **ISN**

Character set: 0123456789

Size: 13 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first three digits are 977, 11th and 12th positions are zeros

TID: **IS2**

Character set: 0123456789

Size: 15 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first three digits are 977, 11th and 12th positions are zeros

TID: **IS5**

Character set: 0123456789

Size: 18 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first three digits are 977, 11th and 12th positions are zeros

ITF

TID: **ITF**

Character set: 0123456789

Size: Arbitrary length

Check digit(s): None (special cases have check digits, but ignore these)

JAN

TID: **J13**

Character set: 0123456789

Size: 13 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first two digits are 45 or 49

TID: **J32**

Character set: 0123456789

Size: 15 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first two digits are 45 or 49

TID: **J35**

Character set: 0123456789

Size: 18 digits

Check digit(s): EAN algorithm, 13th position

Other identifying characteristics: first two digits are 45 or 49

TID: **J08**

Character set: 0123456789

Size: 8 digits

Check digit(s): EAN algorithm, 8th position

Other identifying characteristics: first two digits are 45 or 49

TID: **J82**

Character set: 0123456789

Size: 10 digits

Check digit(s): EAN algorithm, 8th position

Other identifying characteristics: first two digits are 45 or 49

TID: **J85**

Character set: 0123456789

Size: 13 digits

Check digit(s): EAN algorithm, 8th position

Other identifying characteristics: first two digits are 45 or 49

MSI/Plessey

TID: **PLS**

Character set: 0123456789

Size: Arbitrary length

Check digit(s): 2 digits in final positions, calculated by either of two Plessey algorithms

UCC/EAN-128

TID: **E28**

Character set: full ASCII

Size: arbitrary length, subject to numerous identifying characteristics

Check digit(s):

UPC(A)

TID: **UPA**

Character set: 0123456789

Size: 12

Check digit(s): EAN algorithm, 12th position

TID: **UA2**

Character set: 0123456789

Size: 14

Check digit(s): EAN algorithm, 12th position

TID: **UA5**

Character set: 0123456789

Size: 17

Check digit(s): EAN algorithm, 12th position

UPC(E)

TID: **UPE**

Character set: 0123456789

Size: 8 digits

Check digit(s): EAN algorithm, 8th position

Other identifying characteristics: first digit always zero

TID: **UE2**

Character set: 0123456789

Size: 10 digits

Check digit(s): EAN algorithm, 8th position

Other identifying characteristics: first digit always zero

TID: **UE5**

Character set: 0123456789

Size: 13 digits

Check digit(s): EAN algorithm, 8th position

Other identifying characteristics: first digit always zero

5.4 @cuesource@ Code List

The result of a @cuesource@ substitution is normally a two-digit string indicating the source of the @code@:

- None "00"
- Keyboard "01"
- Audio :Cue "02"
- Net:Cue "03"
- :CueCat "04"
- Key Fob Scanner "05"
- Cross Pen "06"
- :CRQ window icon "07"
- :Cue Channel icon "08"
- Mail "14"

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