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DEFINITY®
Enterprise Communications Server

Release 8.3
What's New: Network Call Redirection

How Are We Doing?

Document Title: DEFINITY® Enterprise Communications System (ECS) Release 8.3
                          What's New: Network Call Redirection

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DEFINITY® Enterprise Communications Server Release 8.3

What's New: Network Call Redirection

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What's New: Network Call Redirection

General Information

Overview

Today, call center customers are looking for many ways to reduce their costs. One of these ways is to employ Public Switched Telephone Network (PSTN) Virtual Private Networks (VPNs) to eliminate as much private network cost as possible. These cost reductions are particularly valuable in enterprises or multi-site call-center environments and especially to Enterprise call centers where network costs are typically high. Network Call Redirection (NCR) offers a call redirection method between sites on a public network or a PSTN Virtual Private Network, to help reduce trunking costs.

Audience

This document is intended for external customers, and for Lucent internal audiences. External customers include *DEFINITY*® administrators and Call Management System (CMS) administrators.

In this document

This document contains information on the following topics:

- Feature description
- Feature administration
- Troubleshooting and things to know

Before you start: Platform

Network Call Redirection is a new *DEFINITY* ECS feature available starting with the Release 8.3 ECS. Full administration support of the feature is provided with the *DEFINITY* ECS R8.3 SAT. In addition, `route-to-number` support for ~r vector administration will be added with Release 3 Version 9 *CentreVu*® CMS and *CentreVu* Visual Vectors Version 9.0, scheduled for release in 2001. Existing R3V6 or later CMS and Visual Vectors administration support for BSR will support NCR. NCR is not supported on Category B switches - *DEFINITY* BCS and GuestWorks.

NCR may only be activated for incoming ISDN trunk calls where the associated trunk group has been enabled by the public network service provider to use Network Call Transfer or Network Call Deflection features.

NCR uses the DEFINITY Best Service Routing feature's `queue-to-best` vector step, which is the best approach for implementation. See the DEFINITY Enterprise Communications Server Call Vectoring/Expert Agent Selection Guide, 585-230-521 for complete information on BSR.

Important

Network Call Transfer (NCT) currently works with only the *MCI*® DMS250 network switches. NCT is not currently offered on MCI DEX600 switches.

Until NCR has been tested on specific PSTNs, performance is not guaranteed. To verify operability, contact your CRM Regional Offer Manager.

Compliance

DEFINITY R8.3 Network Call Deflection support is compliant with ETSI Supplementary Services Network Call Deflection ETS 300 207-1 (partial call rerouting in the public network). Network Call Transfer is compliant with ANSI Explicit Network Call Transfer T1.643 (1995).

In the United States, NCR (specifically Network Call Transfer) is currently only supported by *MCI*®* WorldCom (only using the DMS-250 network switches). Outside of the United States, there are several carriers supporting NCR (specifically Network Call Deflection). These carriers include Deutsche Telekom in Germany and British Telecom in the United Kingdom, as well as carriers in France, Belgium, and Singapore. NCD works on a number of PSTN switches outside the United States, including the *Alcatel*† M25 switch in France, the *Alcatel* S-12 switch in Germany, and the *GTX*‡ System X switch in the United Kingdom. Other carriers and countries are expected to add support in the near future.

Important

The compliance requirements are needed to negotiate service with your PSTN. There are PSTN-imposed limits from country to country as to how many times a call can be redirected. Also, PSTNs typically charge for the redirect and UUI transport services.

Trunking considerations

The MCI network requires that the calls being transferred are on the same Direct Access Line (DAL). *DEFINITY* enforces this by only requesting NCT for two calls using the same signaling group. This will result in sending the request on the same D-channel used for the first call with associated signaling or on the associated D-channel when active with Non-Facility Associated Signaling (NFAS) D-channel backup configuration.

With vector-invoked NCT (BSR or route-to-number), the second leg of the call is placed over an idle trunk in the same trunk group as the incoming call to ensure that invocation of NCT is done over the same signaling group. Therefore, vectoring activation of NCT requires that the trunk group be a two-way trunk group.

Usage Allocation is used to reserve two trunks in the two-way trunk group. Using the *DEFINITY* `isdn network facilities` screen, assign an incoming NSF (type 2) and use Usage Allocation to prevent incoming calls from using more than *N-x* trunks where *N* is the number of trunks in the group and *x* is the number to be reserved.

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*MCI is a registered trademark of MCI WorldCom.
†Alcatel is a trademark of Compaganie Financiere Alcatel, Paris, France
‡GTX is a trademark of the Global TeleExchange

With station, ACD agent, or CTI-initiated conference/transfer, if the second leg of the call is set up over an outgoing trunk with the same signaling group as the incoming call, then NCT can be invoked when the transfer is requested. If an outgoing trunk group is assigned to the same signaling group as the incoming trunk group and that outgoing trunk is selected by the outgoing call (using ARS) placed by the user/CTI application for transfer, then a two-way trunk group is not required.

Interactions with other call center features

NCR interacts with or affects the following *DEFINITY* components:

- station transfer by DCP set Transfer button/hangup or switch hook flash transfer by hangup
- station transfer by DCP set Conference button, in which the conferencing (middle) party connects the two calls and then hangs up
- ASAI third-party call transfer
- ISDN trunk administration
- Attendant Vectoring
- Call Vectoring and Best Service Routing (BSR)

CMS, Visual Vectors, and *CentreVu* Supervisor

CMS Reporting and/or administration on public network calls that have been rerouted to another public network endpoint using NCR will be provided by the following Lucent products:

- Release 3 Version 6 (R3V6) *CentreVu* CMS or later (reporting), administration of ~r with R3V9
- Release 6 *CentreVu* Supervisor or later (reporting)
- *CentreVu* Visual Vectors Version 1.0 or later (administration, BSR vector support)
- *CentreVu* Network Reporting Version 8 or later (reporting)

Currently, the ~r vector step used to activate NCR cannot be administered with CMS. Beginning with R3V9 CMS and Release 9 Visual Vectors, the ~r vector step can be administered using those products.

Reporting of calls that have been rerouted to another public switched telephone network (PSTN) endpoint by NCR will be available on the following products when used with a *DEFINITY* ECS R8.3 or later:

- Release 3 Version 6 (R3V6) *CentreVu* CMS
- Release 6 *CentreVu* Supervisor

ISDN calls that are rerouted by NCR to multiple *DEFINITY* ECS sites will be reported by *CentreVu* Explorer II Version 1.0 or later when used with R3V6 or later CMS by using the Universal Call ID (UCID) information that is part of the User-to-User Information for ISDN calls rerouted by NCR.

CMS database changes

CMS database items are affected by NCR, as follows:

- DEFLECTCALLS: In the vector and VDN tables, the DEFLECTCALLS item includes the number of calls redirected using NCR through the BSR feature by using the route-to-number ~r or queue-to-best commands. Successful NCR attempts are pegged as DEFLECTCALLS.
- INTERFLOWCALLS: In the vector and VDN tables, the INTERFLOWCALLS item includes successful BSR interflows using NCR redirections
- LOOKATTEMPTS: In the vector and VDN tables, the LOOKATTEMPTS item includes the number of times the Lookahead Interflow or BSR Interflow was attempted for calls in the vector. Successful Lookahead Interflow or BSR attempts are also counted. NCR invoke attempts (Network Call Deflection or Network Call Transfer) are also reflected in LOOKFLOWCALLS.
- LOOKFLOWCALLS: In the vector and VDN tables, the LOOKFLOWCALLS item includes the number of INTERFLOWCALLS that were redirected by the Lookahead Interflow or BSR features. LOOKFLOWCALLS is a subset of INTERFLOWCALLS and includes LOOKATTEMPTS for the Lookahead Interflow or BSR interflows. With BSR interflow via trunk-to-trunk transfer or NCR, every LOOKATTEMPT will also be counted as a LOOKFLOWCALLS unless a failure occurs.

Station Call Transfer/ Conference

An incoming ISDN call (over a trunk with NCT PSTN service) is answered at the station or voice response unit (VRU or IVR). The station user/VRU answers the call and initiates a "station call transfer" using the transfer feature button or a switch hook flash. The *DEFINITY* automatically will send the `invoke NCT` ISDN FACility message when the transfer is complete only if NCT is assigned to the incoming trunk group and the call is eligible for NCT — that is, if the second leg of the call has been set up over a trunk with the same signaling group as the incoming call. If the station user initiates and completes a three-way conference instead, the DEFINITY automatically sends an `invoke NCT` ISDN message when the initiating station user drops from the three-way conference.

What is Network Call Redirection?

Overview

Call redirection using NCR is accomplished by using either the public network's NCD or NCT options. NCD "clear call upon invocation" is only offered outside of the United States. In the United States, only NCT is offered. In the future, the NCD "retain call until alerting/connect" option will be provided by public networks outside of the United States, but it is not currently available.

Network Call Transfer

NCT occurs after the call is initially answered. With NCT, the *DEFINITY* is required to set up the second leg of the call and then wait for the second site to acknowledge before requesting the PSTN to transfer the first leg of the call to the second leg, and before the PSTN drops the trunks to the *DEFINITY.* The benefit is that the *DEFINITY* retains control over the call and can redirect the call using the trunk-to-trunk method should the NCT invocation fail. Therefore, the NCT option is the most reliable.

After the second leg of the call is initiated and acknowledged by the public switch, the public network joins the original ISDN caller to the redirected-to endpoint and then drops both the original ISDN call and the second leg of the call at the redirecting *DEFINITY* ECS.

Network Call Deflection

NCD occurs before the call is initially answered. With NCD, the public network sets up the second leg of the call to the redirected-to location when the *DEFINITY* deflects the call. There are two PSTN options for NCD, per the ETSI standards: "retain call until alerting/connect" and "clear call upon invocation." This is commonly referred to as a partial call reroute.

With the "clear call on invocation," which is the only NCD operation currently available, the *DEFINITY* loses control of the call once the call has been transferred to the public network for redirection. The *DEFINITY* does not retain control of the call until it has been acknowledged by the network, so there is no alternative transfer possible if the public switch cannot acknowledge and transfer the call to the second location.

The "retain call until alerting/connect" option is not widely available (no known PTSN offers it at this time). With this option, the PSTN sets up the second leg of the call and waits until an alerting message is received before the first leg of the call is dropped. In this case, if the second leg of the call fails, then the *DEFINITY* can redirect the call through another method (such as trunk-to-trunk connection) and not lose the call.

Important   There may be limits placed on the number of times a call may be redirected over the public network. These limits are imposed by the public network service provider. For example, in the United States, MCI currently allows only one redirection per call. In the United Kingdom, there is a limit of 20 call deflections per call. In addition, there may be additional charges associated with redirected calls.

Additionally, some public network service providers do not support forwarding of User-to-User Information (UUI), including ASAI User data, collected digits, VDN name, the VDN in-time (as reflected by the NETINTIME database items), and the UCID. This means that Information Forwarding will be lost and the second leg of the redirected call will look like an entirely new call to the redirected-to *DEFINITY* at the second location. One of the data items lost is the VDN name, which is rerouted to the originally called service (DNIS) information. The indication that the call has been forwarded can be achieved by using dedicated VDNs for call forwarding, but it does reduce the benefits of information forwarding inherent with NCR. Also, this option limits CTI applications as there is no ASAI information or UCID forwarded.

Important   At this time, no PSTNs are offering the Network Call Deflection "retain call until alerting/connect" operation. Therefore, only the Network Call Deflection "clear call upon invocation" offer is available from PSTNs. Both methods are described in this document. It is advised that you negotiate with your PSTN as the NCR feature will work on either platform. NCR is limited by which PSTN platform is available to you.

Implementation

Overview

The NCR feature uses either the Network Call Transfer (NCT) or Network Call Deflection (NCD) operations provided by the PSTN to redirect an incoming ISDN call from a *DEFINITY* Enterprise Communications System (ECS) to another PSTN endpoint. In the call center environment, NCR is intended for multi-site configurations where ISDN calls are interflowed between *DEFINITY* Enterprise Communications Systems (ECSs) over the PSTN by Best Service Routing feature's `queue-to-best` vector step, which is the best approach for administration.

The NCR feature can also be used to redirect an incoming ISDN call by either of the following methods:

- as a substitute for the Lookahead Interflow or non-attendant call vectoring using the `~r route-to-number` vector step
- attendant call vectoring, by using the `~r route-to-number` vector step
- ASAI Third-Party Merge/Call Transfer Operation (Network Call Transfer only)
- station transfer by DCP set Transfer button/hangup or switch hook flash transfer by hangup
- station transfer by DCP set Conference button, in which the conferencing (middle) party connects the two calls and then hangs up

The NCR feature is designed to optimize the rerouting of ISDN calls over the public network since no *DEFINITY* ECS trunks are retained at the redirecting *DEFINITY* after the call is rerouted.

Additionally, NCR may be activated and tracked with ASAI/CTI. The ASAI event reporting capabilities allow tracking of the NCR-redirected calls by their Universal Call ID or ASAI User-to-User Information.

Before you start: Platform

Network Call Redirection is a new *DEFINITY* ECS feature available starting with the Release 8.3 ECS. Full administration support of the feature is provided with the *DEFINITY* ECS R8.3 SAT. For detailed information, see "Before you start: Platform" on page 2 of this document.

NCR activation by BSR vector call processing

Network Call Redirection of ISDN calls will be attempted if the following vector administration has occurred within Best Service Routing. Network Call Redirection on the *DEFINITY* Customer Options form must have been set to Y for this installation to be able to administer NCR:

1. An incoming ISDN call has entered *DEFINITY* vector processing.

2. The call may or may not encounter a vector step, such as an announcement, that causes an "answer" ISDN message (the ISDN CONNect message) to be returned to the trunk associated with the call.

3. The call has encountered one or more `consider location` BSR vector steps that returned valid data (such as Expected Wait Time) and then executed a `queue-to-best` BSR vector step.

4. *DEFINITY* BSR call processing has determined that the call should be interflowed to one of the remote BSR locations previously considered as the best location.

5. The interflow VDN number in the BSR Application Table associated with the best location has been administered with the `Net Redir?` field set to `Y`.

6. The administered interflow number is the public network phone number (without trunk/ARS/AAR access codes) that reaches the remote call center site. The long-distance access (dial "1" in the United States) may also be required depending on the PSTN requirements for the trunk group. This number is used differently during the invoke process depending on which redirection service is available from the public network service provider.

7. With call vectoring activation of NCR, either NCT or NCD will be initiated based on which type of redirection is administered to the trunk group for the incoming call. In either case, a FACility message is sent to the public network over the D-channel associated with the incoming trunk to invoke redirection of the call.

A *successful* NCR completion (when the PSTN indicates a successful NCT invoke) will terminate vector call processing while the original call is connected through the interflowed to call center site by the public network. CMS will track this as a successful network call redirection for the call.

An *unsuccessful* NCR attempt (NCD invoke failure or NCT secondary call failure) results in vector processing going to the next step in the vector following the `queue-to-best` vector step. NCT invocation failure after the second call is established results in the *DEFINITY* reverting to the trunk-to-trunk call connection.

Network Call Transfer

The following steps are used when the `~r route-to-number` vector step is used for Network Call Redirection:

1. The call arrives at the first location.

2. The call is processed by a vector that has a `~r` in the leftmost two character positions in the number field or the `Network Redir?` field on **BSR Application Table** form is set to `Y` for the location specified in the `consider` step for the active VDN application.

3. The *DEFINITY* sends the call to the public network.

4. The public network switch sets up the second leg of the call and passes the codeset 0 UUI information in the SETUP message if this is supported.

5. The *DEFINITY* "tells" the public switch to transfer the call over the public network.

6. The public network merges the second leg of the call to the second site and drops the *DEFINITY.* With NCT, at this point, if the second call fails, the *DEFINITY* can pick up the call again and attempt trunk-to-trunk transfer.

Sample Vectors

The following is a sample BSR Vector:

1. wait 2 seconds hearing ringback

2. consider skill 1 pri b adjust-by 0

3. consider location 1 adjust-by 0

4. consider location 2 adjust-by 0

5. queue-to-best

The following vectors are examples of vectors administered using the `route-to-number` command to use NCR:

Sample ACD Vector:

1. wait 0 seconds hearing ringback

2. goto step 4 if skill oldest-call < 30 secs

3. route-to number ~r13035403001

4. queue-to skill 35 priority m

5. ...

Sample Attendant Vector:

1. goto step 6 if time-of-day is all 17:00 to 09:00
2. wait 0 seconds hearing ringback
3. queue-to attd-group
4. wait 999 secs hearing music
5. stop
6. route-to number ~r13035551002

NCR activation using *DEFINITY* ECS Call Vectoring

If NCR is activated using either the `route-to-number` or `queue-to-best` vector steps, either the NCT or the NCD options may be used to redirect an incoming call while the call is still being processed by the *DEFINITY* ECS vector.

The NCR feature is activated by *DEFINITY* call vectoring if:

* The Best Service Routing feature selection of a "best location" has been administered with the `Net Redir?` option set to `Y` on the BSR Application Table form (with both BSR and LAI active), followed by the execution of the `queue-to-best` vector step (see "Administration" in this document).
* The `route-to-number` vector step is administered with a `~r` as the first item in the `number` field (with or without the LAI option set to "Y" or with Attendant Call Vectoring active — the administration for ~r in `route-to-number` vector steps will be supported by R3V9 CMS and Version 9 Visual Vectors).

    $\implies$ **NOTE:**

    Until R3V9 CMS is available, the ~r in the `route-to-number` vector steps must be administered directly on DEFINITY, and these vectors cannot be accessed by CMS or Visual Vectors. BSR vectors can be administered on R3V6 or later CMS.

NCT

If the NCT feature is enabled for the trunk over which an incoming call is routed to the *DEFINITY*, then NCR redirection will be attempted only if a CONNect ISDN message (answer supervision) has been sent to the public network for the original call. Any vector step of this type, such as wait hearing music or collect *x* digits (refer to the list below) will send the CONNect ISDN message to the public network and NCR will be attempted with either the `route-to-number` or `queue-to-best` vector steps. If none of the vector steps listed below have been executed, then the *DEFINITY* will automatically send a CONNect ISDN message to the public network *before* call transfer is requested from the PSTN. This will start PSTN charging for the call, which is done after the second leg call is established.

If NCT is used, a second call is set up by the redirecting *DEFINITY* to redirect the call using the public network.

NCT call success

With NCT, a call transfer is considered to be successful if:

- The public network responds to the FACility message that requested the NCT operation with a FACility message to the requesting *DEFINITY* indicating "PSTN success." The requesting *DEFINITY* should then receive a DISConnect message for both the first and second leg of the call after the original call and the second leg are joined by the PSTN.

- If the public network responds with a "PSTN failure" FACility message to the requesting *DEFINITY*, which will result in a trunk-to-trunk connection between the first leg of the call and the second leg of the call. *DEFINITY* vector call processing considers this to be successful for the NCR attempt because the original call was not lost; however, a vector event will be generated indicating that the NCT public network operation failed, and this call will not be indicated as "deflected" in CMS.

NCD

NCD may only be activated if a CONNect ISDN message has not been sent to the public network for the call; this is call answer supervision. In that case, the following vector steps should *not* be used by a vector in prior steps if the NCD feature is going to be used for NCR:

- wait hearing music
- collect *x* digits
- announcement
- converse-on split

If NCD is used, the *DEFINITY* does not set up a second call to redirect the call on the public network, and only the incoming ISDN D-channel is used by the public network to redirect the call. The second call is actually set up by the public network.

NCD call success

With NCD, an NCR attempt is considered successful if:

- The public network has validated the NCR request and returned a `call reroute return result` in a DISConnect message to the requesting *DEFINITY* for the first leg of the call if the NCD "clear call on invocation" public network service has been subscribed to for the incoming ISDN call's trunk group. This indicates invoke success.

- The public network has sent a `call reroute return result` indication in a FACility message, followed some time later by a DISConnect message (for the first leg of the call) to the requesting *DEFINITY* if the NCD "retain call until alerting/connect" operation has been subscribed to for the incoming ISDN call's trunk group. The DISConnect is sent after the PSTN has successfully set up the second leg of the call; that is, the public network has received an ALERTing or CONNect ISDN message from the redirected-to public network endpoint. This indicates successful call deflection.

NCR and ASAI

NCR is activated by ASAI call processing when the Third-Party Merge/Call Transfer operation is requested by a CTI operation. This occurs in the following manner:

1. This is typically initiated by the CTI user selecting an icon, menu item, or button to transfer an incoming ISDN call to another user on the public network.

   Since the incoming ISDN call must be connected to a station user before the Third-Party Merge/Call Transfer operation was requested, NCR can only initiate the call redirection if NCT is optioned on the trunk.

2. If a call arrives at an ASAI monitored VDN and either the NCT or NCD feature is used, then ASAI will send appropriate information in the disconnect event to tell the application that the call has been redirected by NCR.

ASAI event reporting allows tracking of ISDN ACD calls that were redirected by NCR in a multi-*DEFINITY* ECS call center environment. These calls can be tracked by the UCID assigned to each call, or by the UUI information inserted by the application through either the Third Party Make Call or Adjunct Routing features.

Station Call Transfer/ Conference

The following steps provide additional information about NCR activation using station call transfer or conference:

1. An incoming ISDN call (over trunk with NCT PSTN service) is answered at the *DEFINITY* station/VRU line port.

2. A station or ACD agent user initiates "station call transfer" using feature button or switch-hook flash

3. VRU (out of vector processing) initiates "station call transfer" using a switch-hook flash.

4. The *DEFINITY* automatically sends an "invoke NCT" ISDN FACility message when the transfer is completed after the second leg is set up.

5. If the station user initiates and completes a three-way conference instead, the *DEFINITY* automatically sends an "invoke NCT" ISDN message when the initiating station/VRU user drops from the three-way conference.

The initiator (station/agent user or VRU) dials the second leg connection by using an access code plus the PSTN number after initiating the transfer. The access code must select an idle outgoing trunk in a trunk group with the same signaling group as the incoming call with NCT active. The transfer is completed when the Transfer button is pressed or the initiator hangs up.

Administration

Overview

This section describes how NCR is administered on the *DEFINITY* ECS.

DEFINITY administration overview

The following fields must be set on the *DEFINITY* administration forms for NCR to work:

Form	Field	Value
For both NCT and NCD		
System Parameters Customer Options	`Call Center Release`	8.3 or later
System Parameters Customer Options	`ISDN Network Call Redirection`	Y
Best Service Routing Application form (for the location to receive the call)	`Net Redir?`	Y
For NCT		
Trunk Group form	`Group Type`	isdn
	`Supplementary Services Protocol`	g
	`Network Call Redirection`	Nortel-transfer (for MCI DMS250 switches)
Signaling Group form	`Network Call Transfer`	Y

Form	Field	Value
For NCD		
Trunk Group Form	Group Type	isdn
	Supplementary Services Protocol	c
	Network Call Redirection	deflect
Signaling Group Form	Network Call Transfer	N
For non-BSR applications or for standard or enhanced Lookahead Interflow applications replaced by NCR supplementing BSR applications		
Call Vector form	leftmost position in the route-to number vector step	~r for each vector that will invoke NCR.

The ~r command takes up two digit positions in the vector step. This works with queue-to-best or check-best vector steps. No change to the vector steps is required for NCR with BSR.

Trunk Group form

For Network Call Transfer, the Group Type field on the **Trunk Group** form must be set to isdn and the Network Call Redirection field must be set to transfer. The Supplementary Service Protocol field must be set to g and the Network Call Redirection field must be set to Nortel-transfer for MCI DMS250 switches. If the NCT feature is subscribed to for the DEFINITY NCR feature, only PRI ISDN 2-way trunks may be used for the incoming-call trunk groups to be administered for vectoring activation of NCT, since the software selects a trunk from the same trunk group to set up the second leg call. Refer to the following figures:

Supplementary Service Protocol: NCT:

```
change trunk-group 29                                        Page   1 of  23
                              TRUNK GROUP

Group Number: 29                    Group Type: isdn        CDR Reports: y
  Group Name: MCI-1                        COR: 1      TN: 1       TAC: 729
    Direction: two-way       Outgoing Display? y
 Dial Access? n                    Busy Threshold: 255       Night Service:
Queue Length: 0
Service Type: sdn                    Auth Code? n           TestCall ITC: rest
                       Far End Test Line No:
TestCall BCC: 4
TRUNK PARAMETERS
          Codeset to Send Display: 7     Codeset to Send National IEs: 7
          Max Message Size to Send: 260   Charge Advice: none
   Supplementary Service Protocol: g     Digit Handling (in/out): enbloc/enbloc


          Trunk Hunt: descend

                                               Digital Loss Group: 13
Calling Number - Delete:     Insert:               Numbering Format:
            Bit Rate: 1200         Synchronization: async    Duplex: full
 Disconnect Supervision - In? y  Out? y
 Answer Supervision Timeout: 0
```

Network Call Redirection: for NCT:

For NCD, the `Supplementary Service Protocol` field must be set to `c` and the `Network Call Redirection` field must be set to `deflect`. Refer to the following figures:

Supplementary Services field: for NCD:

```
change trunk-group 30                                       Page   1 of  23
                              TRUNK GROUP

Group Number: 30                  Group Type: isdn        CDR Reports: y
  Group Name: BT-1                      COR: 1      TN: 1        TAC: 729
   Direction: two-way        Outgoing Display? y
 Dial Access? n                  Busy Threshold: 255        Night Service:
Queue Length: 0
Service Type: sdn                   Auth Code? n            TestCall ITC: rest
                      Far End Test Line No:
TestCall BCC: 4
TRUNK PARAMETERS
          Codeset to Send Display: 7     Codeset to Send National IEs: 7
        Max Message Size to Send: 260    Charge Advice: none
   Supplementary Service Protocol: c     Digit Handling (in/out): enbloc/enbloc

            Trunk Hunt: descend
                                               Digital Loss Group: 13
Calling Number - Delete:     Insert:                Numbering Format:
           Bit Rate: 1200          Synchronization: async    Duplex: full
 Disconnect Supervision - In? y  Out? y
 Answer Supervision Timeout: 0
```

Network Call Transfer field: for NCD:

```
change trunk-group 30                                       Page   2 of  23
TRUNK FEATURES
        ACA Assignment? n               Measured: both      Wideband Support? n
                                                            Maintenance Tests? y
                             Data Restriction? n      NCA-TSC Trunk Member:
                                 Send Name: n      Send Calling Number: n
          Used for DCS? n
  Suppress # Outpulsing? n
 Outgoing Channel ID Encoding: preferred     UUI IE Treatment: shared
                                       Maximum Size of UUI IE Contents: 128
                                           Replace Restricted Numbers? n
                                           Replace Unavailable Numbers? n
                                               Send Connected Number: n


Network Call Redirection: deflect
            Send UCID? y               BSR Reply-best DISC Cause Value: 31
 Send Codeset 6/7 LAI IE? n




                    Network (Japan) Needs Connect Before Disconnect? N
```

Signaling Group form

For NCT, the `Network Call Transfer` field on the **Signaling Group** form must be set to `Y`. Refer to the following figure:

```
change signaling-group 4                                    Page   1 of   5
                            SIGNALING GROUP

 Group Number: 4
                  Associated Signaling? y        Max number of NCA TSC: 0
                     Primary D-Channel: 01B1024   Max number of CA TSC: 0
                                                  Trunk Group for NCA TSC:
        Trunk Group for Channel Selection:
           Supplementary Service Protocol: a        Network Call Transfer? y
```

For NCD, the `Network Call Transfer` field on the **Signaling Group** form must be set to `N`. Refer to the following figure:

```
change signaling-group 4                                    Page   1 of   5
                            SIGNALING GROUP

 Group Number: 4
                  Associated Signaling? y        Max number of NCA TSC: 0
                     Primary D-Channel: 01B1024   Max number of CA TSC: 0
                                                  Trunk Group for NCA TSC:
        Trunk Group for Channel Selection:
           Supplementary Service Protocol: a        Network Call Transfer? n
```

Best Service Routing Application form

On the *DEFINITY* **Best Service Routing Application** form, the Net Redir? field must be set to Y for each location to which calls are to be directed using NCR. Refer to the following figure.

⚠ CAUTION:

The number administered in the interflow VDN field on the Best Service Routing form (or in the ~r vector step on the Call Vector form) should *not* have any ARS prefix or trunk access code. Some PSTN numbers will need to include the long-distance access code. Contact your PSTN for specific information.

```
                        BEST SERVICE ROUTING APPLICATION

   Number: 1      Name: ARS                Maximum Suppression Time: 30    Lock? n

  Num   Location Name    Switch Node   Status Poll VDN   Interflow VDN   Net Redir?
  1                                    95022011          3035551222          y
  2                                    95022111          3035551111          y
  3                                    95032211          95032221            n
```

Call Vector form

For non-BSR applications or for standard or enhanced Lookahead Interflow applications replaced by NCR, supplementing BSR applications, on the *DEFINITY* **Call Vector** form, the leftmost position in the `route-to` vector step (vector step 2 in the example on the next page) must be set to `~r` for each vector that will invoke NCR.

> ⚠️ **CAUTION:**
>
> The number administered in the ~r vector step on the Call Vector form should *not* have any ARS prefix or trunk access code. Refer to the following figure.

```
                              CALL VECTOR                                  \

   Number: 37                    Name _Reroute using NCR_Feature_        Lock? n

       Basic? y   EAS? y   G3V4 Enhanced? y   ANI/II-Digits? y   ASAI Routing? y
   Prompting? y   LAI? y  G3V4 Adv Route? y           CINFO? n           BSR? y

  01 wait         0      secs hearing ringback
  02 route-to     number ~r3035551222
  03
  04
  05
  06
  07
  08
  09
  10
  11
  12
  13
  14
  15
```

Troubleshooting and Things to Know

Overview

This section contains basic information on troubleshooting, as well as important information about administering NCR.

Troubleshooting

General troubleshooting of NCR can be accomplished by using:

- the ISDN message trace information provided by the Message Sequence Tool (MST)
- Vector events displayed by the `display events` *DEFINITY* system administration command.
- To see the behavior of a particular VDN or vector, use the `list trace vdn` and/or `list trace vector` commands to check for NCR errors.
- To check for NCR errors using BSR processing, enter the `ch MST` switch administration terminal command to set the `BSR` and `vector` fields to `Y`, and use the `enable mst` and the `list mist cont` switch administration terminal commands to see NCR-related MST trace data.
- To see NCR-related BSR `peg counts`, enter the `go tcm` switch administration terminal command or enter the `rdd :dpm_mgr Bsr_appl_loc` command to see NCR-related BSR `attempts`, `int errors`, `net errors`, `redirs`, and `discs peg counts`.

NCR troubleshooting

If NCR vector activation fails, use the `display events` switch administration terminal command to check for the following NCR vector events:

- NCR: Invoke trunk not ISDN
- NCR: Bad NCR trunk admin
- NCR: No NCT PSTN service
- NCR: No NCT outgoing trk
- NCR: NCT outgo trk drop
- NCR: PSTN NCT invoke err
- NCR: PSTN NCT netwrk err
- NCR: Used NCT trk-to-trk
- NCR: No NCD PSTN service
- NCR: NCD invalid PSTN nmbr
- NCR: NCD call connect err

- NCR: PSTN NCD invoke err
- NCR: PSTN NCD netwrk err
- NCR: PSTN NCD max redirs
- NCR: PSTN NCD no disc
- NCR: Internal system err

Display Events

If NCR vector activation fails, use the `display events` *DEFINITY* system administration terminal command to check for the following events. Take the suggested course of action based on the vector event(s) displayed using this command.

Vector Event	Suggested Action or Explanation
NCR: Invoke trunk not ISDN	Check that only ISDN trunks are executing the vector steps where NCR is being invoked.
NCR: Bad NCR trunk admin	Check that all Trunk Form and Signaling Group form fields related to the NCR feature are correct.
NCR: No NCT PSTN service	Check that the PSTN service provider has activated the NCT feature for the ISDN trunk being used for NCT call redirections.
NCR: No NCT outgoing trk	Check that the ISDN trunk group is administered as a two-way trunk group and that the Usage Allocation settings for the trunk have been set up correctly.
NCR: NCT outgo trk drop	Shows that the second leg of the NCT call has been dropped due to a trunk hardware problem, or that a vector step has been executed that returned and ISDN DISCONNECT message (such as a `busy` vector step).
NCR: PSTN NCT invoke err	The PSTN switch has not accepted the NCT invocation attempt. Check that the PSTN network switch complies with the NCT standards.
NCR: PSTN NCT netwrk err	The PSTN switch has accepted the NCT invocation attempt, but has rejected it due to some error condition within the network switch. Check with the PSTN service provider.
NCR: Used NCT trk-to-trk	NCT has not been successfully invoked, but the incoming call is still active as a *DEFINITY* trunk-to-trunk connection (this is only an informational message).
NCR: No NCD PSTN service	Check that the PSTN service provider has activated the NCD feature for the ISDN trunk being used for NCD call redirections.

Vector Event	Suggested Action or Explanation
NCR: NCD invalid PSTN nmbr	The PSTN switch has detected that the number used for the NCR invocation that was administered in the `~r route to number` vector step or in the BSR Application Table's `VDN Inteflow Number` field is an invalid PSTN number (the correct PSTN number used through *DEFINITY* administration).
NCR: NCD call connect err	The vector step has been executed before the vector step invoking NCD that sends an ISDN CONNECT message to the PSTN.
NCR: PSTN NCD invoke err	The PSTN has not accepted the NCD invocation attempt. Check that the PSTN network switch complies with the NCD standards.
NCR: PSTN NCD netwrk err	The PSTN switch has accepted the NCD invocation attempt, but has rejected it due to some error condition within the network switch. Check with the PSTN service provider.
NCR: PSTN NCD max redirs	The PSTN has detected that the call has been redirected by NCD more that the public network "maximum number of call deflections limit" will allow.
NCR: PSTN NCD no disc	The PSTN switch has not disconnected the ISDN trunk after performing the NCD or NCT call redirection.
NCR: Internal system err	The DEFINITY problem with call processing for the NCR invocation attempt. Alternately, for NCT, the redirected-to endpoint is programmed with a `wait hearing silence` instead of a `wait hearing ringback` vector step.

Things to know

The following important items should be known.

Failures

Failures can occur in NCR after the `queue-to-best` or the `~r route-to number` vector step is executed. Vector programming should be provided to route the call in another manner is the NCR operation fails.

- **Failure to invoke Network Call Transfer:** If Network Call Transfer is invoked and the public network rejects the call, the call will revert to a trunk-to-trunk transfer. In this case, the call is not lost. However, vector processing is stopped at the redirecting *DEFINITY* switch.

- **Failure to invoke Network Call Deflection:** If NCD is invoked and the public network rejects the call, the call is disconnected form the rerouting *DEFINITY.* In this case, the call is lost. No vector processing takes place at the redirecting *DEFINITY* switch.

NCT and Call Vectoring

With NCT, the transferring vector may or may not answer the first leg of the call before redirecting the call over the public network. If the call has not been answered by vector processing, DEFINITY will automatically answer the call before requesting NCT.

NCD

With NCD, no steps in the vector can be executed that answer the call or the redirection will not occur. Vector steps that should not be used before NCD is invoked are:

- announcement
- wait hearing music
- converse-on split
- collect

Announcement Vector Steps

Announcement vector steps cannot be used with NCD before NCD is to be invoked. Announcement vector steps can be used in following vector steps if NCD fails. Announcement vector steps can be used with NCT.

ASAI Drop Event

Successful NCR call redirection causes an ASAI "drop" event to be sent to the CTI application with a CV_REDIR cause value of decimal(30) after the redirection is completed. Only one NCR "drop" event is received for a successful NCR operation when the NCT PSTN feature is used, even though two trunks are dropped by the PSTN.

ASAI Third-Party Merge/Call Transfer

The CTI application requests a third-party merge/call transfer ASAI operation to transfer the call to the second switch. This is only used if Network Call Transfer is not available. Once the two calls merge, then ASAI sends a third-party acknowledgement, and when the call is completed, ASAI sends a drop event report, and the third-party call ends.

Feature Interactions

Network Call Redirection interacts with several existing call center features. The features, and the effect NCR has on them, are described in this section.

Attendant Vectoring

Attendant Vectoring can use the `route-to number` vector step with the ~r option to route calls to attendants located at another DEFINITY ECS switch node. The operation of the NCR feature using the NCD or NCT networks features to accomplish the call redirection is exactly the same as for redirecting ACD calls.

Advice of Charge

No new capabilities will be added for the NCR feature for the Advice of Charge PSTN feature. The Advice of Charge feature should be used with the same trunk facilities used for the NCR feature.

BCMS

No change will be made to BCMS for support of NCR. redirected calls will be tracked as completed calls since the PSTN will disconnect the incoming facility of the original call when the call is redirected to another site.

Enhanced Information Forwarding

For the NCR feature, Enhanced Information Forwarding will transport User-to-User information for the incoming ISDN call to the PSTN endpoint that receives the redirected call. The use of the Enhanced Information Forwarding capability with NCR (the recommended configuration) requires that the incoming call trunk group be assigned as "shared" (i.e., the `UUI IE treatment` field is set to `shared`). However, if the trunk group is set up as service provider, only the ASAI user information (or user information provided by the incoming ISDN call) will be included in the UUI IE sent on a non-shared basis to the redirected-to PSTN endpoint.

Lookahead Interflow

NCR activation using the `route-to number` vector step does note require Lookahead Interflow to be active to provide multi-site capabilities, which are required for considering remote locations and access to the BSR Application Plan form.

Service Observing by VDN

If the DEFINITY Service Observing by VDN feature is used to service observe a VDN, where the NCR feature is used to redirect incoming ISDN calls, the service-observer will hear the same tones, music, and/or announcements heard by the incoming caller before the NCR feature reroutes the call to another PSTN endpoint. When the NCR operation is completed, the service-observer will be dropped as an observer of the incoming call and placed in the service-observing queue associated with the VDN.

Trunk-to-Trunk Transfer

If the NCR feature is optioned and the ASAI Third-Party make Call/transfer operation is used to redirect an incoming ISDN to a PSTN endpoint, the `Trunk-to-Trunk Transfer` field on the System-Related Customer Options for must be set to Y for the call redirection to succeed. If the `route-to number` or BSR `queue-to-best` vector step uses the NCR feature to redirect an incoming ISDN call to a PSTN endpoint, the Trunk-to-Trunk Transfer customer option does not have to be se to Y.

VDN Return Destination

If the VDN Return Destination feature is administered for the VDN associated with a vector that causes the NCR feature to be invoked, the VDN Return Destination feature will be canceled when the call is redirected by NCR.