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**DAI Parameter for the "tel" URI  
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Status of this Memo

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Abstract

This document defines a "dai" parameter for the "tel" Uniform Resource Identifier (URI) to support the Dial Around Indicator (DAI). The "dai" parameter is associated with the "cic" parameter, defined in [[RFC4694](#)], and indicates how the carrier identified in the "cic" parameter was selected. This document also expands the use of the "cic" parameter to support pre-subscribed and dialed long-distance carrier requirements.

Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119](#) [[RFC2119](#)].

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## 1. Introduction

Before equal access was supported in the United States, only AT&T's subscribers could dial "1" to reach AT&T when they made long distance calls. Other long distance carriers' subscribers needed to dial extra digits to reach their long distance carriers. For fair competition, the Federal Communication Commission in the U.S. mandated the support for equal access that allowed any long distance carrier's subscriber to follow the same dialing plan to reach his/her pre-subscribed long distance carrier. The regulatory bodies in many other countries also have mandated equal access.

To allow a telephony subscriber to use a non-pre-subscribed long distance carrier for some of their long distance calls, the U.S. has implemented the dialing prefix "10XXX" that was later expanded to "101XXXX" in the dialing plan. The prefix allows the caller to use "XXX" or "XXXX" to specify the long distance carrier to handle that particular call. This dialing prefix was also used to identify the local toll carrier in the United States when equal access also applied to the local toll calls.

One of the purposes of the DAI is to indicate to the long distance carrier that receives a call from the local exchange carrier whether the call came from a pre-subscribed customer or not. Due to operator-assisted calls, where the called party or a third party may be charged for the call in some cases, the DAI is also used to indicate to the receiving long distance carrier if it is the primary or alternate preferred long distance carrier of the charged party.

The long distance carrier information, the Carrier Identification Code (CIC), can be carried in the "cic" parameter [[RFC4694](#)], a parameter of the "tel" Uniform Resource Identifier (URI) [[RFC3966](#)]. The "cic" parameter defined in [[RFC4694](#)] identifies the freephone service provider that serves the freephone number. As described in [[RFC4694](#)], it can also be used to carry the CIC associated with the



carrier who is to handle a call to a geographic telephone number; such usage is leveraged in this document. When the carrier that is assigned the CIC receives the call, the "dai" parameter defined in this document indicates to that carrier how it was selected.

## **2. Terminology**

This document uses the following terms:

- o Long Distance Carrier: a telephone company that provides network transit services to route long-distance calls between different network operators.
- o Network Operator: a service provider that operates a network for the purpose of providing telephone service to its users.
- o Operator: when the term "operator" is used on its own (without the "network" qualifier), it refers to the third-party operator that is temporarily connected in an operator-assisted call. The operator may obtain billing information verbally from the caller, such as the identity of the long distance carrier to handle the call.

## **3. Abbreviations**

ANSI American National Standards Institute  
BNF Backus-Naur Form  
CIC Carrier Identification Code (also cic)  
DAI Dial Around Indicator (also dai)  
FCC Federal Communications Commission  
ENUM Telephone Number Mapping  
GSTN Global Switched Telephone Network  
GW Gateway  
IETF Internet Engineering Task Force  
IP Internet Protocol  
ISUP Integrated Services Digital Network User Part  
SS7 Signaling System number 7  
SW Switch  
URI Uniform Resource Identifier

## **4. Formal Syntax**

The following syntax specification uses the Augmented Backus-Naur Form (ABNF) as described in [RFC 5234](#) [[RFC5234](#)] and defines the "dai" pname and associated pvalues as an instantiation of the "parameter" production rule of the "tel" URI defined in [[RFC3966](#)].



```
dai      = ";dai="  dai-value
dai-value = "no-ind"      /
           "presub"       /
           "presub-da"    /
           "presub-da-unkwn" /
           "da"           /
           "cic-chrg-pty"  /
           "altcic-chrg-pty" /
           "verbal-clg-pty" /
           "verbal-chrg-pty" /
           "emergency"     /
           "presub-unkwn-da" /
           "operator"      /
           pvalue
```

The "dai" parameter can appear in the "tel" URI at most once. The "dai" parameter MUST NOT be present if the "cic" parameter is not present. When the "cic" parameter is present due to carrier selection (whether presubscribed or not), the "dai" parameter MUST be present so that its presence in the tel URI can differentiate the carrier selection case from the freephone case. Please see [[RFC4694](#)] for the syntax specification of the "cic" parameter.

Below are the descriptions of the values of the "dai" parameter.

"no-ind": indicates that it is not known how the carrier identified in the CIC was selected.

"presub": indicates that the CIC contains the caller's presubscribed carrier; the caller did not dial a Carrier Identification Code.

"presub-da": indicates that the CIC contains the caller's dialed Carrier Identification Code; the selected carrier is the caller's presubscribed carrier.

"presub-da-unkwn": indicates that the CIC contains the caller's presubscribed carrier; no information is provided on whether or not the caller dialed a Carrier Identification Code.

"da": indicates that the CIC contains the caller's dialed carrier-identification-code; the selected carrier is not the caller's presubscribed carrier.

"cic-chrg-pty": indicates that the CIC contains the preferred carrier of the charged party.

"altcic-chrg-pty": indicates that the CIC contains the alternate carrier of the charged party.



"verbal-clgPty": indicates that the CIC contains the carrier delivered verbally by the calling party.

"verbal-chrg-pty": indicates that the CIC contains the carrier delivered verbally by the charged party.

"emergency": indicates that the CIC is selected for emergency call handling.

"presub-unkwn-da": indicates that the CIC contains the caller's dialed carrier-identification-code; no information is provided on whether or not the selected carrier is the caller's presubscribed carrier.

"operator": indicates that the CIC contains a carrier selected by a network operator.

## **5. Normative Rules**

This section discusses how a network node adds the "dai" parameter to the "tel" URI or handles a received "tel" URI that contains the "dai" parameter. Since the "dai" parameter goes with the "cic" parameter, the latter is included in some of the discussions below. The phone numbers of the caller and called party are geographic numbers in the discussions.

When the call signaling message contains a "tel" URI that carries the "cic" parameter, ENUM [[RFC3761](#)] could map the phone number in the "tel" URI to other URI(s) such as SIP URI [[RFC3261](#)]. In that case, the mapped URI instead of the parameters in the "tel" URI MAY be used to route the call. In this document it is assumed that ENUM is not involved.

### **5.1. Network Model**

The network model in Figure 1 is used to help describe the rules for sending and receiving the "dai" parameter. The discussion below focuses on the handling of the "tel" URI in the signaling messages. It is assumed that the signaling message will contain the "cic" and "dai" parameters after it leaves "Network Node A" for a call originated by the user or after it leaves "GSTN GW" when the call comes from the GSTN (Global Switched Telephone Network).





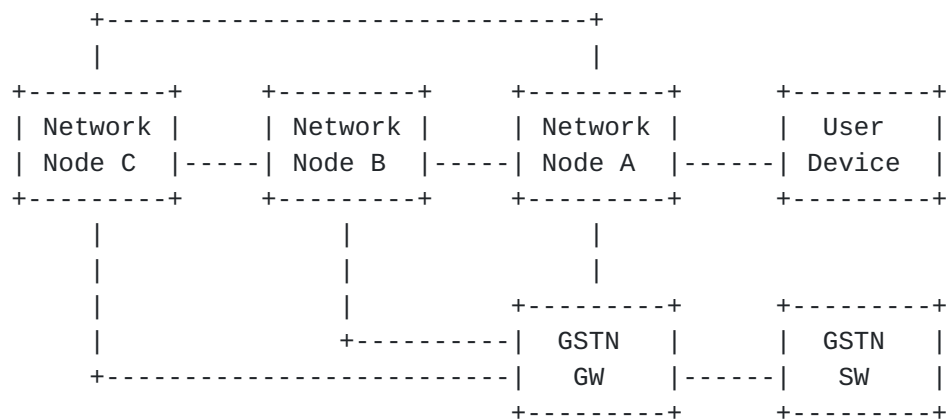


Figure 1. Network Model

"User Device" generates the signaling message requesting a call setup.

"Network Node A" represents those network nodes that receive the call request and can analyze the type of call (e.g., local toll, long distance or international based on the calling party number/address and called party number) and determine or identify the carrier that is to handle the call. The latter can be based on the information from the caller (e.g., "101XXXX"), the presubscribed carrier information in the service profile of the caller, or via the involvement of an operator that interacts with the calling party, called party (e.g., for collect call) or a third party (e.g., when the call is charged to a third party) for an operator-assisted call. If configured by the network operator, Node A can apply a preferred CIC for all calls where carrier selection is needed. Note that although Figure 1 shows Node A as a single entity, its responsibilities can be shared amongst multiple Node As such that the Node A that is connected to or communicates with the user device is separate from the Node A that determines or identifies the carrier to handle the call.

"Network Node B" represents those network nodes that are not associated with the carrier identified in the "cic" parameter and need to route the signaling message that contains the "cic" and "dai" parameters towards the carrier identified in the "cic" parameter.

"Network Node C" represents those network nodes that receive the signaling message from "Network Node B" and belongs to the carrier identified in the "cic" parameter.

"GSTN GW" stands for "Global Switched Telephone Network (GSTN) Gateway (GW)". It interfaces between the Internet Protocol (IP)



domain and the GSTN domain for signaling protocols and the user traffic. The GSTN includes the wireline network, wireless network and other circuit-switched networks. Signaling traffic and user traffic could be handled by separate network nodes. In this document, both types of traffic are handled by "GSTN GW" to simplify the discussion.

"GSTN Switch (SW)" is a circuit switch in the GSTN that is connected with the GSTN GW.

"User Device", "Network Node A", "Network Node B" and "Network Node C" are in the IP domain. "Network Node A", "Network Node B" and "Network Node C" can route the calls to the GSTN via the GSTN GW.

The rules for various scenarios are described below.

## **5.2. Adding the "dai" Parameter to the "tel" URI**

This section discusses those cases where "Network Node A" receives a call request containing a "tel URI" from "User Device" and may need to add the "dai" parameter to the "tel" URI. If the "cic" Parameter is included in the received "tel URI" but the "dai" Parameter is not included, and "Network Node A" does not know how the carrier is selected or does not want to reveal how the carrier is selected (based on local policy), "Network Node A" MUST include the "dai" Parameter and set it to "no-ind". If "Network Node A" does know how the carrier is selected, and does want to reveal this information, then it MUST include a "dai" parameter as described in the following sub-sections.

DAI information has potential billing impacts, and it is therefore important that it is trustworthy. "Network Node A" may have a trust relationship with "User Device" whereby it trusts the information provided by "User Device". In such cases, "Network Node A" may use the DAI information provided by "User Device". In all other cases, "Network Node A" MUST remove any DAI information provided by "User Device" before further processing. Furthermore, the signaling message including the "tel URI" SHOULD be hop-by-hop integrity-protected, e.g. by the use of TLS in the case of SIP. If it is not, the parameters provided cannot be trusted.

### **5.2.1. CIC Information Provided in Call Signaling from "User Device"**

When an originating user dials the carrier prefix digits to select a carrier at call setup time, "User Device" MUST signal the CIC information to "Network Node A". "User Device" can provide the CIC information via call signaling in one of two ways.



1. Include the "cic" parameter in the "tel" URI to carry the selected CIC. It is outside the scope of this document as to how "User Device" adds the "cic" parameter to the "tel" URI.
2. Include the selected CIC information in the dialed string (e.g., "101XXXX" followed by a national number). [[RFC4967](#)] specifies one way to deliver the dialed string in the SIP protocol [[RFC3261](#)]. How the dialed string is carried in the signaling message to "Network Node A", and how "Network Node A" identifies the CIC information and the called phone number from the received dialed string is outside the scope of this document. "Network Node A" MUST convert the received dial string to a valid "tel" URI containing a "cic" parameter (by means outside the scope of this document), and continue processing as if the "tel" URI had been received from the "User Device".

When receiving a call request that contains the "tel" URI "cic" parameter but not the "dai" parameter (or on converting a received dialed string to a "tel" URI containing a "cic" parameter), and an operator is not involved in call handling, "Network Node A" MUST follow the rules described below. The cases where an operator is involved in determining/selecting a carrier to handle the call are addressed in 4.2.3 and 4.2.4 below.

- o If the call is to be handled by the carrier "Network Node A" is associated with (that is, the carrier network is the network within which Node A resides), "Network Node A" MUST remove the "cic" parameter in the "tel" URI, and MUST NOT include the "dai" parameter if it needs to forward the signaling message to another network node.
- o If "Network Node A" selects a carrier for the call (e.g., because local policy does not allow the caller to specify a carrier), and the selected carrier is different than the caller's pre-subscribed carrier, or the caller does not have a pre-subscribed carrier, then "Network Node A" MUST update the received "cic" parameter to identify the selected carrier. In addition, "Network Node A" MUST add a "dai" parameter containing the value "operator" to the "tel" URI.
- o If the "User Device" specified carrier is the same as the caller's pre-subscribed carrier and "Network Node A" knows that the CIC information is provided by "User Device", and "Network Node A" chooses (based on local policy) to reveal that the presubscribed carrier was selected by the user, then "Network Node A" MUST set the "dai" parameter to "presub-da" and include the parameter in the "tel" URI.



- o If "Network Node A" is not sure whether the CIC information is provided by "User Device" (e.g., a proxy server between "User Device" and "Network Node A" is involved), and the specified carrier is the same as the caller's pre-subscribed carrier, then "Network Node A" MUST set the "cic" parameter to contain the caller's pre-subscribed carrier's CIC and include the parameter, if not yet present, in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "presub-da-unkwn" and include the parameter in the "tel" URI.
- o If the "User Device" specified carrier is different from the caller's pre-subscribed carrier, "Network Node A" MUST set the "cic" parameter to contain the "User Device" specified carrier and include the parameter, if not yet present, in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "da" and include the parameter in the "tel" URI.
- o If the "User Device" specifies a carrier and "Network Node A" cannot determine if the selected carrier is the caller's presubscribed carrier, or "Network Node A" chooses (based on local policy) not to reveal whether the selected carrier is the presubscribed carrier, or there is no presubscribed carrier assigned to the caller, then "Network Node A" MUST set the "cic" parameter to contain the "User Device" specified carrier and include the parameter, if not yet present, in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "presub-unkwn-da" and include the parameter in the "tel" URI.

#### **5.2.2. CIC Information Not Provided in Call Signaling From "User Device"**

In this scenario, "User Device" did not provide any CIC information in call signaling and an operator is not involved in call handling. "Network Node A" MUST follow the rules described below. The cases where an operator is involved in determining/selecting a carrier to handle the call are addressed in 4.2.3 and 4.2.4 below.

- o If the call is to be handled by the carrier "Network Node A" is associated with, "Network Node A" MUST NOT include the "cic" and "dai" parameters in the "tel" URI if it needs to forward the signaling message to another network node.
- o If "Network Node A" selects a carrier that is different from the caller's pre-subscribed carrier to handle the call, it MUST set the "cic" parameter to contain the CIC it selects and include the parameter in the "tel" URI. "Network Node A" MUST include the "dai" parameter in the "tel" URI and set it to "operator".





- o If the caller has a pre-subscribed carrier that can handle the call, "Network Node A" MUST set the "cic" parameter to contain the caller's pre-subscribed carrier's CIC and include the parameter in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "presub" and include the parameter in the "tel" URI.

### **5.2.3. Operator-assisted Call Handling, Caller Pays for the Call**

When an operator is involved in handling the call request from the caller, "Network Node A" may or may not have the CIC information available from the signaling message. If the caller is to pay for the call, the operator may interact with the caller to determine the carrier to handle the call when applicable. If the CIC information is available from call signaling and the operator also interacts with the caller to get the CIC information, the CIC provided by the operator MUST be used. How the caller indicates an operator-assisted call and passes the CIC information in call signaling is outside the scope of this document.

"Network Node A" through the assistance of an operator MUST follow the rules described below.

- o If the call is to be handled by the carrier "Network Node A" is associated with, "Network Node A" MUST remove the "cic" parameter, if present in the "tel" URI, and MUST NOT include the "dai" parameter if it needs to forward the signaling message to another network node.
- o If "Network Node A" selects a carrier other than the caller's pre-subscribed carrier or the one specified by "User Device" in call signaling or indicated verbally by the caller to the operator, "Network Node A" MUST set the "cic" parameter to contain the CIC it selects and include the parameter, if not yet present, in the "tel" URI. "Network Node A" MUST include the "dai" parameter in the "tel" URI and set it to "operator".
- o If the carrier specified by "User Device" in call signaling or indicated verbally by the caller to the operator is selected by "Network Node A", and is the same as the caller's pre-subscribed carrier, "Network Node A" MUST set the "cic" parameter to contain the caller's pre-subscribed carrier's CIC and include the parameter, if not yet present, in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "presub-da" and include the parameter in the "tel" URI.



- o If "Network Node A" is not sure whether the CIC information is provided by "User Device" or the operator did not indicate if the CIC information came from the caller (either verbally or dialed), and the CIC provided is the same as the caller's presubscribed carrier, then "Network Node A" MUST set the "dai" parameter to "presub-da-unkwn" in the process described above.
- o If the carrier specified by "User Device" in call signaling or verbally by the caller to the operator is different from the caller's pre-subscribed carrier, and that carrier is being used, "Network Node A" MUST set the "cic" parameter to contain the CIC of the selected carrier and include the parameter, if not yet present, in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "da" and include the parameter in the "tel" URI.
- o If the operator receives verbal instructions from the caller to use a specific carrier and it is not known if that carrier is the caller's presubscribed carrier, or "Network Node A" chooses (based on local policy) not to reveal whether the selected carrier is the presubscribed carrier, or there is no presubscribed carrier assigned to the caller, then "Network Node A" MUST set the "cic" parameter to contain the CIC of the specified carrier and include the parameter, if not yet present, in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "verbal-clgPty" and include the parameter in the "tel" URI.

#### **5.2.4. Operator-assisted Call Handling, Called Party or Third Party Pays for the Call**

There are cases where the call is charged to the called party or a third party. How the caller indicates an operator-assisted call and passes the CIC information in call signaling is outside the scope of this document. The caller will indicate to the operator that either the called party or a third party is to pay for the call. The operator then checks with the charged party if he/she agrees to pay for the call and may verbally get the CIC information from the charged party or retrieve the primary and alternate preferred carrier information from some databases. It is assumed that the "tel" URI in the call signaling from "User Device" does not contain the "cic" parameter and/or "dai" parameter: They MUST be ignored if they are present.

"Network Node A" through the assistance of an operator MUST follow the rules described below.



- o If the call is to be handled by the carrier "Network Node A" is associated with, "Network Node A" MUST remove the "cic" parameter, if present, and MUST NOT include the "dai" parameter in the "tel" URI.
- o If "Network Node A" selects a carrier other than the carrier identified by the operator to handle the call, it MUST set the "cic" parameter to contain the CIC it selects and include the parameter in the "tel" URI. "Network Node A" MUST include the "dai" parameter in the "tel" URI and set it to "operator".
- o If the charged party's primary preferred carrier is indicated by the operator, and that carrier is used for the call handling, "Network Node A" MUST set the "cic" parameter to contain that carrier's CIC and include the parameter in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "cic-chrg-pty" and include the parameter in the "tel" URI. How "Network Node A" knows that the selected carrier is the charged party's primary preferred carrier is outside the scope of this document.
- o If the charged party's alternate preferred carrier is indicated by the operator, and that carrier is used for the call handling, then "Network Node A" MUST set the "cic" parameter to contain that carrier's CIC and include the parameter in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "altcic-chrg-pty" and include the parameter in the "tel" URI. How "Network Node A" knows that the selected carrier is the charged party's alternate preferred carrier is outside the scope of this document.
- o If the operator receives verbal instructions from the charged party to use a specific carrier and it is not known if that carrier is the charged party's primary or alternate preferred carrier, then "Network Node A" MUST set the "cic" parameter to contain the CIC of the specified carrier and include the parameter in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "verbal-chrg-pty" and include the parameter in the "tel" URI.
- o If the caller contacts an operator for an emergency situation and a carrier that "Network Node A" is not associated with needs to handle the call, "Network Node A" MUST set the "cic" parameter to the CIC of that carrier and include the parameter in the "tel" URI. "Network Node A" MUST set the "dai" parameter to "emergency" and include the parameter in the "tel" URI.

#### **5.2.5. Call Signaling Received From the GSTN SW by GSTN GW**

The GSTN GW may receive the Signaling System number 7 (SS7) Integrated Services Digital Network User Part (ISUP) signaling message from the GSTN SW that contains the CIC information. For



example, American National Standards Institute (ANSI) ISUP carries the CIC information in the "Carrier Selection Information" parameter. The mapping between the "dai" parameter and ISUP is outside the scope of this document.

#### **5.2.6. CIC and DAI Information is Provided in Call Signaling From "User Device"**

This section describes the cases where the network operator configures the "User Device" to provide the user-dialed or pre-subscribed CIC, and the corresponding DAI information, to "Network Node A". The mechanism to configure the "User Device" is outside the scope of this document.

When the "User Device" is configured to provide the CIC and DAI information to "Network Node A", it MUST insert the "tel" URI "cic" and "dai" parameters in the call signaling toward "Network Node A" as follows:

- o If the caller-dialed carrier is the same as the caller's pre-subscribed carrier, and the "User Device" inserts the "dai" parameter in call signaling, the "User Device" MUST set the "dai" parameter to "presub-da" and include the parameter in the "tel" URI.
- o If the caller-dialed carrier is different from the caller's pre-subscribed carrier, and the "User Device" inserts the "dai" parameter in call signaling, the "User Device" MUST set the "dai" parameter to "da" and include the parameter in the "tel" URI.
- o If the caller dials a carrier, and the "User Device" inserts the "dai" parameter in call signaling, and "User Device" cannot determine if the selected carrier is the caller's presubscribed carrier, then "User Device" MUST set the "dai" parameter to "presub-unkwn-da" and include the parameter in the "tel" URI.
- o If the caller does not dial a carrier, and the "User Device" inserts the caller's pre-subscribed carrier information and the "dai" parameter in call signaling, then "User Device" MUST set the "dai" parameter to "presub" and include the parameter in the "tel" URI.

When receiving a call request containing the "tel" URI "cic" and "dai" parameters from a "User Device" which is configured to send these parameters, and an operator is not involved in call handling, "Network Node A" MUST NOT alter "cic" and "dai" parameters in the "tel" URI. The cases where an operator is involved in determining/selecting a carrier to handle the call are addressed in 4.2.3 and 4.2.4.





### **5.3. Routing Calls Based on "tel" URI Containing "cic" and "dai"**

This section discusses how "Network Node A", "Network Node B", "Network Node C" or "GSTN GW" handles the signaling messages that contain the "dai" and "cic" parameters in the "tel" URI. Scenarios that do not involve the "dai" parameter in the "tel" URI are outside the scope of this document.

DAI information has potential billing impacts, and it is therefore important that it is trustworthy. It is assumed that all of the Network Nodes have a trust relationship with each other whereby they trust the DAI information provided. In all other cases, the Network Node MUST remove any DAI information provided before further processing. Furthermore, the signaling message including the "tel URI" SHOULD be hop-by-hop integrity-protected, e.g. by the use of TLS in the case of SIP. If it is not, the parameters provided cannot be trusted.

#### **5.3.1. Network Node A**

After "Network Node A" has added the "dai" parameter and/or "cic" parameter to the "tel" URI and is ready to route the call, it MUST route the call based on the rules described in [[RFC4694](#)] to "Network Node B", "Network Node C" or "GSTN GW". "Network Node A" MAY record the "dai" value in the call detail record. If the carrier that Network A is associated with is the one to handle the call, Network Node A MUST remove the "cic" and/or "dai" if they are present before routing the call.

#### **5.3.2. Network Node B**

Since "Network Node B" is not associated with the carrier identified by the CIC in the "cic" parameter, it MUST route the call based on the "cic" parameter as stated in [[RFC4694](#)] to another "Network Node B", "Network Node C" or "GSTN GW". "Network Node B" MAY record the "dai" value in the call detail record.

#### **5.3.3. Network Node C**

Since "Network Node C" is associated with the carrier identified by the CIC in the "cic" parameter, it MUST remove the "cic" parameter and the "dai" parameter, if present, before it determines how to handle the call. "Network Node C" MAY record the "dai" value in the call detail record. How "Network Node C" continues the call routing/handling is outside the scope of this document.



#### **5.3.4. GSTN GW**

If "GSTN GW" determines that the call is to be routed from the IP domain to "GSTN SW", and SS7 ISUP is used in the GSTN, then the "GSTN GW" MUST map the "dai" parameter to the corresponding ISUP parameter. For example, when interworking with ANSI ISUP, the "dai" parameter is mapped to the ISUP "Carrier Selection Information" parameter.

When "GSTN GW" receives a signaling message from "GSTN SW" that contains the carrier selection information, it MUST set the "dai" parameter based on the received carrier selection information. "GSTN GW" MUST route the call based on the "cic" parameter as stated in [\[RFC4694\]](#) to "Network Node A", "Network Node B" or "Network Node C". "GSTN GW" MAY record the "dai" value in the call detail record.

The mapping between the "dai" parameter and ISUP is outside the scope of this document.

#### **5.3.5. User Device**

"User Device" is not expected to receive signaling messages that contain the "dai" and/or "cic" parameters. If the received signaling messages contain the "tel" URI with the "dai" and/or "cic" parameters, "User device" SHALL ignore the parameter(s).

### **6. Examples**

1. A caller whose pre-subscribed carrier has a CIC of "+1-6789" makes an outbound call with the following "tel" URI:

```
tel:+1-202-533-1234
```

"Network Node A" adds the "dai" and "cic" parameters to the "tel" URI as shown follows:

```
tel:+1-202-533-1234;cic=+1-6789;dai=presub
```

2. A caller whose pre-subscribed carrier has a CIC of "+1-6789" makes an outbound call to +1-202-533-1234 and specifies to use the CIC of "+1-2345" in call signaling with the following "tel" URI:

```
tel:+1-202-533-1234;cic=+1-2345
```

"Network Node A" recognizes that the caller has selected a non-presubscribed carrier to handle the call. "Network Node A" adds the "dai" parameter to the "tel" URI as shown follows:

```
tel:+1-202-533-1234;cic=+1-2345;dai=da
```



3. A caller makes a collect call to +1-202-533-1234 through an operator. The operator at "Network Node A" interacts with the called party and gets a verbal approval to use the CIC of "+1-3456". "Network Node A" adds the "dai" and "cic" parameters to the "tel" URI as follows:

tel:+1-202-533-1234;cic=+1-3456;dai=verbal-chrg-pty

## **7. Security Considerations**

In addition to those security implications discussed in [\[RFC3966\]](#), there may be new security implications associated with the "dai" parameter depending on the carrier who uses the information.

Changing the content of the "dai" parameter may cause a call to be rejected by or cause some problems (e.g., collecting call charge) to the carrier who handles the call. For example, changing from "presub" to "da" may cause the call to be rejected if the carrier that is to handle the call only handles calls from its pre-subscribed subscribers. Changing "da" to "presub" may cause a call that would be rejected to be processed by a carrier who later finds out it cannot collect the call charge from the caller or has to pay more than the call charge to collect the call charge from the caller via a third party (e.g., local exchange carrier).

DAI information has potential billing impacts, and it is therefore important that it is trustworthy. "Network Node A" may have a trust relationship with "User Device" whereby it trusts the information provided by "User Device". In such cases, "Network Node A" may use the DAI information provided by "User Device". In all other cases, "Network Node A" MUST remove any DAI information provided by "User Device" before further processing.

It is assumed that all of the Network Nodes have a trust relationship with each other whereby they trust the DAI information provided. In all other cases, the Network Node MUST remove any DAI information provided before further processing.

It is RECOMMENDED that protocols carrying the "tel" URI provide hop by hop integrity protection for the signaling messages including the URI and its associated parameters. This allows detection of any unauthorized changes to the contents of the "tel" URI. If integrity protection is not used, the parameters provided cannot be trusted.

Please note that the information in the "dai" parameter may not be authenticated; therefore, the use of the information by the recipient of the "tel" URI is done at its own risk.



## **8. IANA Considerations**

The "dai" parameter defined in this document needs to be registered with IANA as a new parameter for the "tel" URI [[RFC3966](#)].

### **1. Parameter name - dai**

Applicability - used to indicate how a carrier was chosen for handling a call

Mandatory or optional - optional

Restrictions on syntax - see [Section 4](#).

Reference to a specification - defined in this document

## **9. References**

### **9.1. Normative References**

[RFC2119] S. Bradner, [RFC 2119](#), "Key words for use in RFCs to Indicate Requirement Levels", March 1997.

[RFC3966] H. Schulzrinne, [RFC 3966](#), "The tel URI for Telephone Numbers", December 2004.

[RFC5234] D. Crocker and P. Overell, [RFC 5234](#), "Augmented BNF for Syntax Specifications: ABNF", January 2008.

[RFC4694] J. Yu, [RFC 4694](#), "NP Parameters for the "tel" URI", October 2006.

### **9.2. Informative References**

[RFC3261] J. Rosenberg, et al., [RFC 3261](#), "SIP: Session Initiation Protocol", June 2002.

[RFC3761] P. Faltstrom and M. Mealling, [RFC 3761](#), "The E.164 to Uniform Resource Identifiers (URI) - Dynamic Delegation Discovery System (DDDS) Application (ENUM)", April 2004.

[RFC4967] B. Rosen, [RFC 4967](#), "Dial String Parameter for the Session Initiation Protocol Uniform Resource Identifier ", July 2007.

## **10. Change History**

(Note to editor - please remove this section in final version.)

### **10.1. Changes from version 01->02**

- [Section 3](#): clarified descriptions of "dai" parameter values





- [Section 4.2.5](#), plus various other places: removed text that said the "dai" parameter was not included in certain cases, since we now use "no-ind" these cases.
- [Section 4.3](#),
  - o Item A: added text specifying that if Node-A is the carrier then it removes "cic"
  - o Item D: added procedures for inbound calls from GSTN

#### **[10.2. Changes from version 02->03](#)**

- [Section 4.2](#) is updated to indicate that the "User Device" may insert the "dai" parameter.
- [Section 4.2.6](#) is added to include procedures when the "User Device" inserts the "dai" parameter.

#### **[10.3. Changes from version 03->04](#)**

- Added note to [Section 4.2](#) (and similar note to other sections) describing the billing implications DAI, and the trust issues related to the network accepting it from the "User Device".

#### **[10.4. Changes from version 04->05](#)**

- Clarified semantics of certain "dai" values in [Section 3](#).

#### **[10.5. Changes from version 05->06](#)**

- Clarified semantics of "presub-unkwn-da" in [Section 3](#).
- [Section 4.2.1](#), 4th bullet, clarified that the "presub-da-unkwn" case applies when the received carrier matches the presubscribed carrier. Also added text to make 4th bullet stand-alone, instead of referring to previous bullet.
- Fixed typos.

#### **[10.6. Changes from version 06->07](#)**

##### **[Section 4.2.1](#)**

- Updated point 2 to make result of the dialed-string case the same as receiving tel URI containing a "cic" parameter. Updated and simplified the following bullets to take advantage of this change, since they could be written assuming "cic" parameter was always present.
- Updated 2nd bullet to add case where caller does not have a pre-subscribed carrier
- Updated 3rd bullet to clarify that "presub-da" is driven by local policy setting to reveal that the presubscribed carrier was selected by the user



- Updated 6th bullet to clarify that network-node-A sets the "DAI" parm to "presub-unkwn-da" based on local policy, or because there is no presubscribed carrier.

#### **10.7. Changes from version 07->08**

- Added new Terminology section-2
- [Section 4](#) - updated syntax to all lower case.
- [Section 5.2](#) - Clarified that sub-sections cover the case where Node-A knows and wants to reveal the "dai" value
- [Section 5.2.3](#) - clarified throughout that operator can receive CIC either in signaling from user device, or verbally from user.
- [Section 5.2.4](#)
  - o Updated title; original title inadvertently included freephone calls
  - o Clarified throughout that these are operator-assisted calls
- [Section 5.2.5](#) and 5.3.4 - removed text that says there's a 1:1 mapping between ANSI and ISUP, and clearly sated that DAI-ISUP mapping is out-of-scope
- [Section 5.3](#) - Clarified title to distinguish this section from 5.2.
- [Section 8](#) - corrected reference to section in this document that defines syntax of the new "dai" parameter

#### **10.8. Changes from version 08->09**

Resubmitted to restart expiration timer.

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