CIBER Record Migration Overview and Recommendation for X0 to X2 CIBER Record Type Migration

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Version 1.0

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Revision History

Date	Version	Description
4 Oct 2006	0.1	Initial release
15 December 2006	1.0	Released to Plenary

1. Introduction

1.1 Purpose

This document describes and discusses the migration from the X0 Records to the X2 Records. This document also discusses the population of the MDN and MSID fields in the CIBER Record protocol when the MDN and the MSID are the same and when they are split.

1.2 Referenced Documents

CIBER Protocol

1.3 Acronyms and Abbreviations

Term	Meaning
CIBER 2.5	CIBER's current version.
ESN	Electronic Serial Number
ID	Identification
IMEI	International Mobile Equipment Identifier
IMSI	International Mobile Subscriber
IRM	International Roaming MIN
MBI	MIN Block Identifier
MCC	Mobile Country Code
MDN	Mobile Directory Number
MEID	Mobile Equipment Identifier
MIN	Mobile Identification Number
MNC	Mobile Network Code
MSID	Mobile Station Identifier
MSISDN	Mobile Subscriber ISDN Number
WNP	Wireless Number Portability

1.4 Contributors

Cibernet Corporation, KDDI, QUALCOMM, Sprint/Nextel, Syniverse Technologies, VeriSign and Verizon Wireless.

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2. Flash-cut Date

2.1 Introduction

Cibernet announced in the March 2006 CIBER Update that, as of January 16, 2007, the designated clearinghouses will have an edit in place that will prohibit exchange of the X0 Records. To ensure that there is no loss of revenue from rejection of records, carriers will have to migrate to the X2 Records before the January 16, 2007 flash-cut date.

Prior to January 16, 2007, carriers can still exchange the older record types but carriers must inform all of their roaming partners that the older record types are still being used. After the January 16, 2007, flash-cut date, an edit will be in place at the clearinghouses to prevent the exchange of the older record types.

If a carrier still wishes to exchange the older record types after the flash-cut date, then they will have to contact their respective clearinghouse and request that the clearinghouse bypass the edit. This also requires consent from each of their roaming partners (i.e. via bilateral agreement) and is not recommended as a long-term solution.

2.2 Migration from X0 Records to X2 Records

Note: Within this document, ”X0 Records” indicates record types 10, 20, 30, or 50, and “X2 Records” indicates record types 22, 32, 42, and 52.

Carriers who migrate to the X2 Records will enjoy a variety of benefits as a result of migrating:

- The X2 Records are able to capture more information than the X0 Records, such as the caller ID, MDN, IMEI/MEID, called country, and serving country.
- Using the X2 Records reduces the need to use two separate CIBER record types to capture all the necessary call detail. For example, if a carrier used to create a Type 10 for air-only call and a Type 20 for air and toll call, this information can now be captured and distinguished in just one Type 22 Record.
- In utilizing the X2 Records, a carrier can reduce the number of calls to Customer Care by providing more detail on the subscriber bill such as features that were used during the call, length of the call, the called number, and the called place. This additional information can also help Customer Care better support customers when they call.
- The X2 Records also ensure data integrity. With the validation of the records, through the clearinghouses and billing vendor, a carrier is assured that the data captured in the CIBER Records are accurate.

- Several pieces of information from the CIBER Record can be included in the subscriber's bill. Information that can be extracted from the CIBER Record to the subscriber bill is length of the call, where the call was placed, and any special features used during the call, i.e. directory assistance, call forwarding, and call waiting. Note that CIBER X0 also contains information that can be put into the subscriber's bill; but that X2 contains more information such as the Caller ID (which may contain the calling number on a mobile-terminated call) and the serving country and called country (for even greater detail on where the call was placed and to where).

2.3 Pitfalls of not migrating to the X2 Records

As with the benefits, there are repercussions for not migrating to the X2 Records:

- If a carrier decides to continue utilizing the X0 Records, they will have to pay their designated clearinghouses an additional charge to convert the X0 Records to X2 Records.
- There are limitations to the conversion process; for example, as when converting from a Type 20 Record to a Type 22 Record, and when the handset is utilizing the MEID (Mobile Equipment Identifier) instead of an ESN (Electronic Serial Number). The ESN field is only 11 positions as opposed to the ESN/IMEI/MEID field, which has 19 positions. The MEID information will not be contained in a Type 20 Record to start with so it cannot be "converted" (or carried-over) to the MEID field in a Type 22 record.
- With the MSID/MDN split, there is the potential of populating the MSID or MDN fields incorrectly, which can cause a carrier to bill the wrong subscriber or customer. For example, if the MDN, the dial-able number, is populated in the MSID field, then the record can be sent to the wrong home carrier, since the MSID contains the line range owned by the home carrier. The X2 format includes dedicated fields for both MDN and MSID, so there should be less chance of incorrect population.

With the examples noted above it is easy to see how any of these scenarios can result in a loss of roaming revenue.

3. Wireless Number Portability (WNP)

3.1 Introduction

Cibernet introduced the X2 Record types in 1999 in response to the United States' Wireless Number Portability (WNP) initiative. With WNP, a wireless subscriber has the ability to change carriers and keep the same phone number.

The MIN is tied to a specific carrier, and previously served as the dial-able number as well as the network registration and call processing number. To support WNP, the MIN remained the same and a new number type/space called MDN was created. As an editorial convenience to manage the eventual replacement of MIN with IMSI, the term "MIN" is being replaced in many documents/standards with "MSID."

The MSID can either refer to the IMSI (up to 15-digits), the 10-digit MIN, or the 10-digit IRM. The first 5 or 6 digits of an IMSI or the first 6 digits of an MIN or IRM identify the carrier that owns the roaming subscriber; the MSID is generally not known to the subscriber. The MDN value is the subscriber's dial-able number, and can be ported from one carrier to another.

The US, Canada, and New Zealand are currently splitting the MSID and MDN. Other countries are in the process of or planning to implement WNP. Although your country might not require WNP, if you have inbound roamers from areas that require WNP, then your billing systems must be able to handle WNP.

The MSID field is required to be populated because this field is used by the clearinghouse to route the records appropriately to the correct home carrier. The MBI, which is the first 6 digits of a block of 10,000 MINs (called the line range), is used to uniquely identify a wireless carrier. Each serving carrier exchanges technical data sheets with their roaming partners, providing the market and BID information for each MBI line range. This information is used by each serving carrier to map the MBI to the home BID on the CIBER record.

When IRMs (a subset of the 10-digit numbering space) are used, the first four digits of the IRM are typically sufficient to identify the home carrier. When a (true) IMSI is used instead of an MIN, the Mobile Country Code (MCC) and Mobile Network Code (MNC) digits at the start of the IMSI serve to identify the home carrier.

This split needs identification and population in the CIBER Record to correctly bill the subscriber's home carrier via the MSID, and to identify the correct subscriber via the MDN. The MSID identifies the carrier and the MDN identifies the subscriber.

The following sections provide examples on how to populate an X2 record when the MDN and MSID are split, and when the MIN (MSID) and MDN are identical.

3.2 MDN/ MSID Split

When a subscriber decides to port his/her number to another carrier, the subscriber will now have two numbers: the MIN (MSID), which identifies the subscriber's carrier; and the MDN, which is the dial-able phone number of the subscriber.

When populating the CIBER record, if the subscriber's MIN is **301-555-4321**, and the MDN is **703-543-5387**.

The MSID field will be populated as follows:

MSID	301555432100000

The MSISDN/MDN field will be populated as follows:

MSISDN/MDN	703543538700000

3.3 MDN/MIN (MSID) Split Not Required

If the subscriber has not ported his/her number, in many cases, within the North American Numbering Plan, then the MIN and the MDN will be the same. When populating the CIBER Record, if the subscriber's MDN is **301-555-4321**.

The MSID field will be populated as follows:

MSID	30155543210000

The MSISDN/MDN field will be populated as follows:

MSISDN/MDN	30155543210000

3.4 MSID Indicator

It is also necessary to populate the MSID indicator to identify whether this field will contain either an ITU-T E.212 IMSI or an MIN.

4. Relevance

4.1 Introduction

The correct population of the MDN, MSID and MSID indicator fields within the CIBER 22 records and with the applicable data will ensure successful collection of the wholesale usage *and* end-user billing.

4.2 Next Steps

Currently, the CIBER X2 Records allow the MSISDN/MDN field to be zero filled when the MDN is not available or when number portability is not required. Cibernet is soliciting feedback from carriers to remove the edit that allows the MSISDN/MDN field to be zero filled. Cibernet, along with the CDMA Development Group will continue to solicit feedback and input from the carriers. Once a consensus is reached, Cibernet will finalize these changes in the January 1, 2007 CIBER Update.

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A. Guidelines for Testing

As with any major change impacting a billing system, migrating from X0 record types to X2 record types requires thorough testing. Failing to do so may impact revenue streams.

Carriers should test the record migration first with their clearinghouse and then with each roaming partner to ensure a successful migration. The guidelines below are offered for consideration during carrier-to-clearinghouse migration testing.

- The clearinghouse should test the operator's CIBER 2.5 records in the clearinghouse's test environment.
- The clearinghouse should work with carriers throughout the test.
- Carriers migrating record types should be able to test unlimited files.
- A clearinghouse certification certificate can be provided to the carrier, if needed, to indicate a successful carrier-to-clearinghouse record migration.

A.1 Test Plan for CIBER X0 to X2 Migration

Below is a test scenario for carriers migrating from the X0 Records to the X2 Records. It is recommended that the serve and home carriers test their systems both as a sender and a receiver.

The following scenario is carrier-to-carrier:

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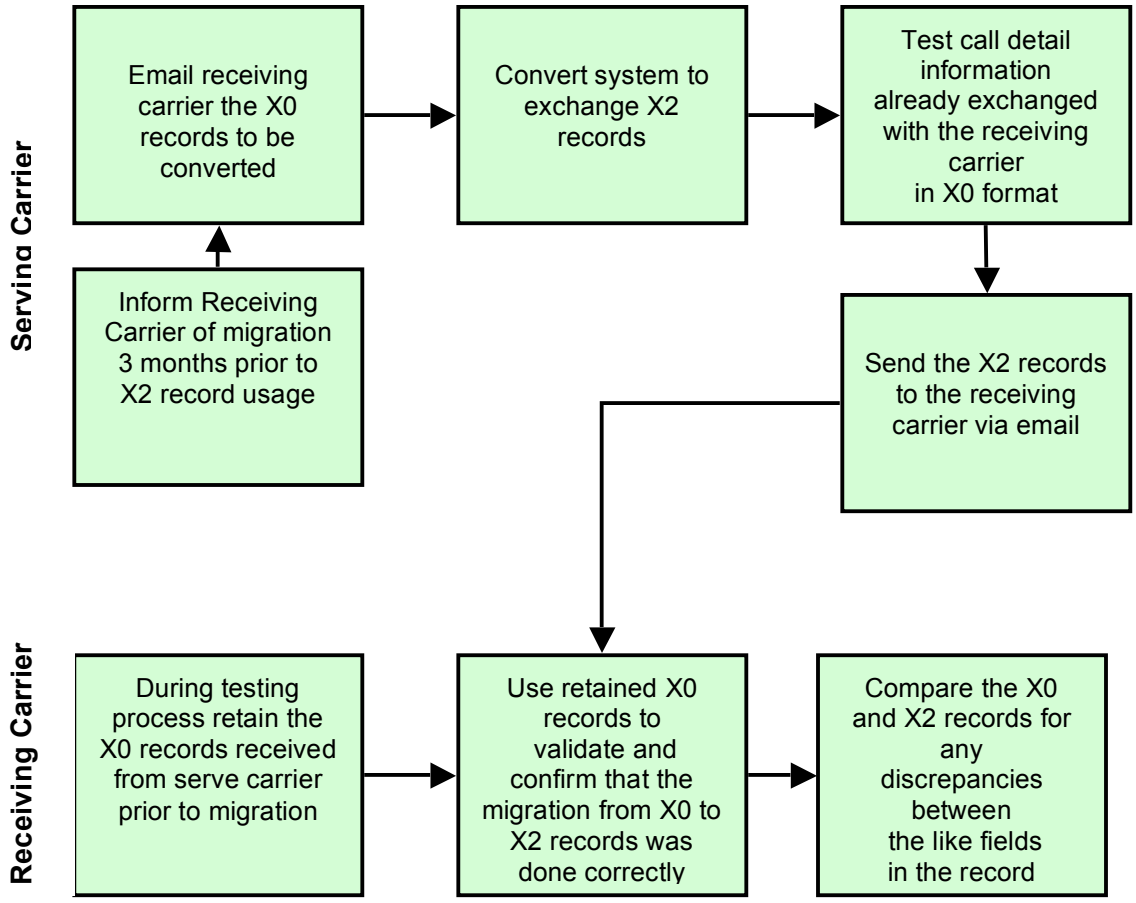
Serving Carrier
Email receiving carrier the X0 records to be converted
Convert system to exchange X2 records
Test call detail information already exchanged with the receiving carrier in X0 format
Inform Receiving Carrier of migration 3 months prior to X2 record usage
Send the X2 records to the receiving carrier via email
Receiving Carrier
During testing process retain the X0 records received from serve carrier prior to migration
Use retained X0 records to validate and confirm that the migration from X0 to X2 records was done correctly
Compare the X0 and X2 records for any discrepancies between the like fields in the record

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