Oracle® Communications Network Charging and Control

EDR Control Agent Technical Guide

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Contents

About This Document

Scope

The scope of this document includes all the information required to install, configure, and administer the Oracle Communications Network Charging and Control EDR Control Agent.

Audience

This guide was written primarily for system administrators and persons installing, configuring, and administering the EDR Control Agent application. However, sections of the document may be useful to anyone requiring an introduction to the application.

Prerequisites

A solid understanding of UNIX and a familiarity with IN concepts are an essential pre-requisite for safely using the information contained in this technical guide. Attempting to install, remove, configure, or otherwise alter the described system without the appropriate background skills, could cause damage to the system; including temporary or permanent incorrect operation, loss of service, and may render your system beyond recovery.

Although it is not a pre-requisite to using this guide, familiarity with the target platform would be an advantage.

This manual describes system tasks that should only be carried out by suitably trained operators.

Related Documents

The following documents are related to this document:

- *Service Logic Execution Environment Technical Guide*
- *Advanced Control Services Technical Guide*
- *Service Management System User's Guide*
- *Service Management System Technical Guide*

Document Conventions

Typographical Conventions

The following terms and typographical conventions are used in the Oracle Communications Network Charging and Control (NCC) documentation.

Formatting Convention	Type of Information
Special Bold	Items you must select, such as names of tabs. Names of database tables and fields.
Italics	Name of a document, chapter, topic or other publication. Emphasis within text.
Button	The name of a button to click or a key to press. **Example:** To close the window, either click **Close**, or press **Esc**.
Key+Key	Key combinations for which the user must press and hold down one key and then press another. Example: **Ctrl+P** or **Alt+F4**.
`Monospace`	Examples of code or standard output.
`Monospace Bold`	Text that you must enter.
variable	Used to indicate variables or text that should be replaced with an actual value.
menu option > menu option >	Used to indicate the cascading menu option to be selected. Example: **Operator Functions > Report Functions**
hypertext link	Used to indicate a hypertext link.

Specialized terms and acronyms are defined in the glossary at the end of this guide.

Chapter 1

System Overview

Overview

Introduction

This chapter provides a high-level overview of the application. It explains the basic functionality of the system and lists the main components.

It is not intended to advise on any specific Oracle Communications Network Charging and Control (NCC) network or service implications of the product.

In this Chapter

This chapter contains the following topics.

Introduction to EDR Control Agent

Purpose

The Oracle Communications Network Charging and Control EDR Control Agent (ECA) is a SLEE interface that takes EDRs and translates them into InitialDPs (IDPs). These IDPs can be used to trigger control plans on an SLC. This enables a user to use additional functionality provided by call processing (such as control plans) to process information collected in EDRs from switches or other sources.

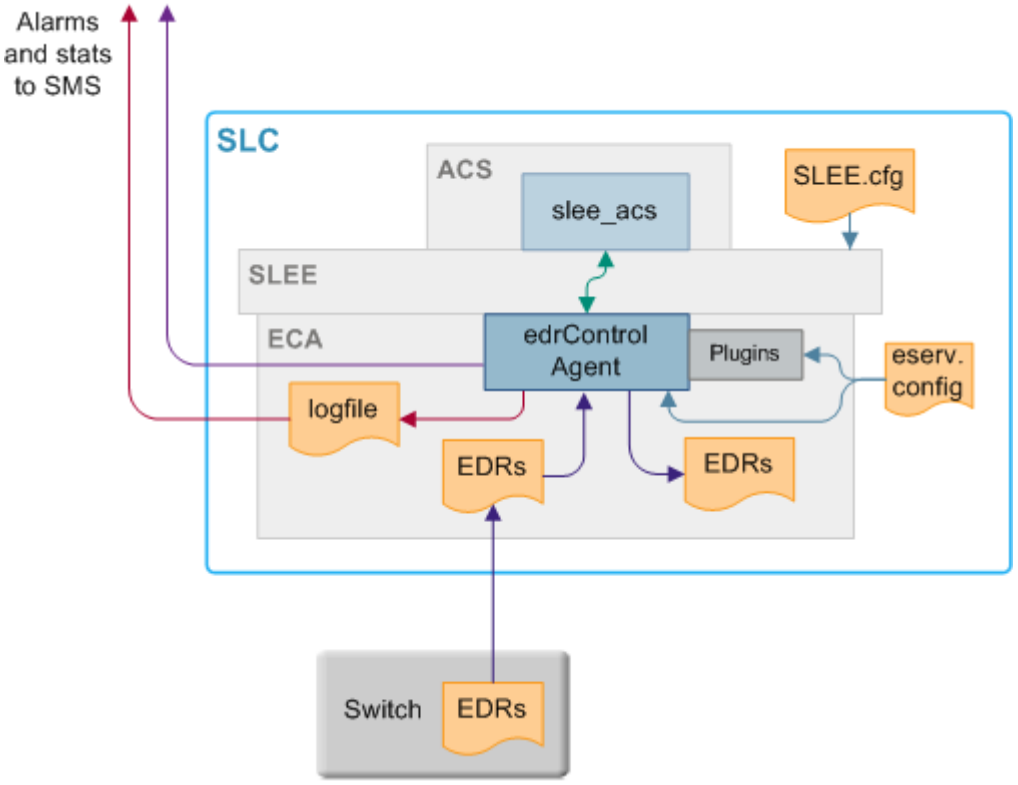
Example solution

One possible use of the ECA is to check if a subscriber is using his or her SIM card with its original handset. This can be achieved by sending the IMEI to an ACS control plan.

ECA reads the IMEI from the EDR and sends it to slee_acs in an InitialDP in the tbcdExtension*string* field. The control plan then uses a Profile Field Comparison node to compare the relevant extension call context value with a profile field holding the subscriber's original IMEI. If it matches, a discount or a bonus can be applied to the account.

Component diagram

This diagram shows the ECA components.



Component descriptions

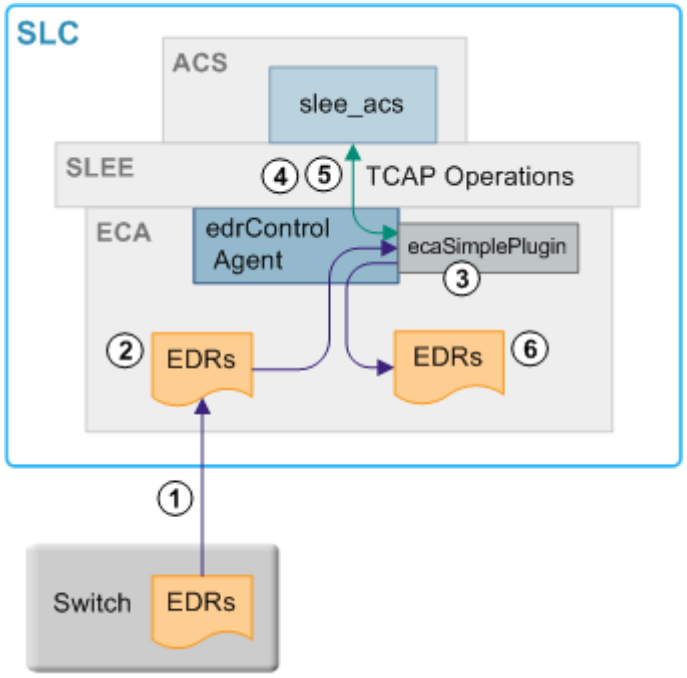
This table describes the main components involved in the ECA application.

Component	Description	Further Information
edrControlAgent	Main ECA executable, responsible for all EDR processing. Opens and parses EDRs in the input directory and moves EDRs into success or failed directories depending on plug-in processing. Uses plug-in libraries to process specific EDR types.	*edrControlAgent* (on page 11)
edrSimplePlugin.so	Basic plug-in for edrControlAgent.	*edrSimplePlugin.so* (on page 15)
SLEE	The SLEE routes calls between applications and interfaces.	*Service Logic Execution Environment Technical Guide*
SLEE.cfg	Main configuration file for SLEE. Provides some startup configuration for ECA, including number of instances.	*Service Logic Execution Environment Technical Guide*
IN Applications	This could be any call processing component, but is usually slee_acs.	*Advanced Control Services Technical Guide*
Switch	One of many possible sources of EDRs.	

Component	Description	Further Information
eserv.config	Main configuration file for ECA.	**eserv.config** *Configuration* (on page 7)

EDR processing diagram

This diagram shows ECA processing.



EDR processing

This table describes the stages involved in processing EDRs.

Note: This process uses slee_acs. However, other compatible call processing software could be used.

Step	Action
1	EDR files arrive in the input directory.
2	edrControlAgent moves the EDRs from the input directory to the processing directory.
3	edrControlAgent passes the EDR file to its plug-in. The plug-in parses EDRs from the EDR file.
4	For each EDR in the EDR file, the edrControlAgent plug-in generates a TCAP BEGIN containing an InitialDP and call duration that the edrControlAgent sends to slee_acs across the SLEE. The plug-in populates the InitialDP using specific configuration (such as *idpParameters* (on page 16)). For more information about: • SLEE configuration, see *NCC Service Logic Execution Environment Technical Guide* • slee_acs, see *Advanced Control Services Technical Guide*
5	slee_acs runs the relevant control plan. This may involve further TCAP operations being passed between slee_acs and edrControlAgent.

Step	Action
6	When the call is over (due to an appropriate TCAP operation or a timeout), the edrControlAgent's plug-in closes the file. If the EDRs were successful, it moves the file to the success directory. Any EDRs that could not be parsed are written to a separate file in the failed directory.

Supported InitialDP operations

edrControlAgent uses CAP 3 INAP in messages to slee_acs. These INAP operations are supported:

- InitialDP
- ApplyChargingReport
- EventReportBCSM
- RequestReportBCSMEvent
- ApplyCharging
- Connect
- Continue
- ReleaseCall

Unsupported InitialDP parameters

All other INAP operations are not supported, including:

- ConnectToResouce
- EstablishtemporaryConnection
- PlayAnnouncement
- PromptAndCollectUserInformation
- DisconnectLeg
- CallInformationRequest

Warning: You must set up the control plans, the **acs.conf** file, and **eserv.config** file so that these and other unsupported operations are not received by edrControlAgent in EDRs.

Statistics and Reports

Introduction

edrControlAgent logs statistics to the Service Management System statistics subsystem if configured to do so in **eserv.config**. edrControlAgent uses Application ID ECA.

For more information about the SMS statistics subsystem, see *Service Management System Technical Guide* and *Service Management System User's Guide*.

Statistics

This table describes the statistics that can be logged by edrControlAgent.

Statistic	Description
INITIALDPS_SENT	Number of InitialDP operations sent.
CALL_PROCESSING_FAILED	Number of InitialDPs for which processing failed.
APPLY_CHARGING_CONNECT_SUCCESSFUL	Number of calls where AC-Connect received.

Statistic	Description
APPLY_CHARGING_CONTINUE_SUCCESSFUL	Number of calls where AC-Continue received.
APPLY_CHARGING_CONNECT_INSUFFICIENT_FUNDS	Number of calls where (AC-Connect) duration is greater than granted time.
APPLY_CHARGING_CONTINUE_INSUFFICIENT_FUNDS	Number of calls where (AC-Continue) duration is greater than granted time.
RELEASE_CALL	Number of calls where a (ReleaseCall) was received. Detail = cause.
CONNECT	Number of calls where Connect received.
CONTINUE	Number of calls where Continue received.
TIMED_OUT	Number of calls for which the tssf timer expired. For more information about the tssf timer, see *tssf* (on page 15).

Reports

ECA does not install any specific reports. However, you can report on any statistics that are recorded using the SMS Application report on the Service Management System Report Functions screen.

For more information about running SMS reports, see *Service Management System User's Guide*.

Report example

This text shows an example of the SMS Application report run for ECA for the previous 24 hours showing Total counts for each statistic.

```
Application Statistics Listing
==============================
Hours since: 24
Application: ECA
Report Type: Totals

08 January 2008, 02:27:35



Node Name         Statistics ID                                    Totals
----------- ------------------------------------------------    --------
prodscp1          CONNECT                                              0
prodscp1          CONTINUE                                           106
prodscp1          TIMED_OUT                                         1200
prodscp1          RELEASE_CALL                                      1209
prodscp1          INITIALDPS_SENT                                   6102
prodscp1          CALL_PROCESSING_FAILED                              91
prodscp1          APPLY_CHARGING_CONNECT_SUCCESSFUL             3192
prodscp1          APPLY_CHARGING_CONTINUE_SUCCESSFUL                   0
prodscp1          APPLY_CHARGING_CONNECT_INSUFFICIENT_FUNDS       79
prodscp1          APPLY_CHARGING_CONTINUE_INSUFFICIENT_FUNDS           0

10 rows selected.


Completed
```

Chapter 2

Configuration

Overview

Introduction

This chapter explains how to configure the Oracle Communications Network Charging and Control (NCC) application.

In this chapter

This chapter contains the following topics.

Configuration Overview

Introduction

This topic provides a high-level overview of how you configure EDR Control Agent.

Configuration components

You configure ECA by using the following components:

Component	Locations	Description	Further Information
eserv.config	SLCs	The most important configuration file. It configures most NCC applications, including ECA processes. Use the ECA section of **eserv.config** to configure ECA.	**eserv.config** *Configuration* (on page 7).
SLEE.cfg	SLCs	Sets details about how the ECA runs, including number of instances.	*Service Logic Execution Environment Technical Guide*

eserv.config Configuration

Introduction

The **eserv.config** file is a shared configuration file, from which many Oracle Communications Network Charging and Control (NCC) applications read their configuration. Each NCC machine (SMS, SLC, and VWS) has its own version of this configuration file, containing configuration relevant to that machine. The **eserv.config** file contains different sections; each application reads the sections of the file that contains data relevant to it.

The **eserv.config** file is located in the **/IN/service_packages/** directory.

The **eserv.config** file format uses hierarchical groupings, and most applications make use of this to divide the options into logical groupings.

Configuration File Format

To organize the configuration data within the **eserv.config** file, some sections are nested within other sections. Configuration details are opened and closed using either { } or [ ].

- Groups of parameters are enclosed with curly brackets – { }
- An array of parameters is enclosed in square brackets – [ ]
- Comments are prefaced with a # at the beginning of the line

To list things within a group or an array, elements must be separated by at least one comma or at least one line break. Any of the following formats can be used, as in this example:

```
{ name="route6", id = 3, prefixes = [ "00000148", "0000473"] }
{ name="route7", id = 4, prefixes = [ "000001049" ] }
```

or

```
{ name="route6"
    id = 3
    prefixes = [
        "00000148"
        "0000473"
    ]
}
{ name="route7"
    id = 4
    prefixes = [
        "000001049"
    ]
}
```

or

```
{ name="route6"
    id = 3
    prefixes = [ "00000148", "0000473" ]
}
{ name="route7", id = 4
    prefixes = [ "000001049" ]
}
```

ECA eserv.config example section

ECA adds a cut-down `ECA` section to **eserv.config** file. It is not a full list of all parameters that are available.

The `ECA` section contains initial values that you may need to amend to suit a specific installation. After amended, ECA runs with no further changes to Oracle. Where additional implementation changes need to be made to Oracle, refer to the *Background Processes* (on page 11) chapters for full descriptions of all process parameters.

Editing the File

Open the configuration file on your system using a standard text editor. Do not use text editors, such as Microsoft Word, that attach control characters. These can be, for example, Microsoft DOS or Windows line termination characters (for example, ^M), which are not visible to the user, at the end of each row. This causes file errors when the application tries to read the configuration file.

Always keep a backup of your file before making any changes to it. This ensures you have a working copy to which you can return.

Loading eserv.config Changes

If you change the configuration file, you must restart the appropriate parts of the service to enable the new options to take effect.

Chapter 3

Background Processes

Overview

Introduction

This chapter explains the processes that are started automatically by Service Logic Execution Environment (SLEE).

Note: This chapter also includes some plug-ins to background processes which do not run independently.

In this chapter

This chapter contains the following topics.

edrControlAgent

Purpose

edrControlAgent processes InitialDPs and sends them to an application across the SLEE. The edrControlAgent uses separate plugins to process different types of EDRs. It can only run one plugin per instance.

For more information about the SLEE, see *Service Logic Execution Environment Technical Guide*.

Startup

This task is started by the SLEE, by the following line in the **SLEE.cfg** configuration file:

```
INTERFACE=edrControlAgent eca.sh /IN/service_packages/ECA/bin 1 EVENT
```

Note: The above are defaults and may vary.

Configuration

To load and operate, the edrControlAgent reads the `ECA` section of the **eserv.config** file. The high-level structure of the `ECA` section is shown below.

```
ECA = [
    {
        sleeInterfaceName = "uniqueID"
        inputDirectory = "dir"
        processingDirectory = "dir"
        badFileDirectory = "dir"
        fileNamePattern = "pattern"
        sleeServiceKey = key
        maxIdpsPerSecond = seconds
        statisticsEnabled = true|false
        tssf = seconds
        pluginLibrary = "lib"
```

```
        PluginSpecificConfig = {
            inapServiceKey = key
            commentChar = "str"
            separatorChar = "str"
            idpParameters = [
                "str"
                ...
            ]
            NumberRules = [
                { [remove=int][, replace=str] }
                ...
            ]
            successDirectory = "dir"
            failedDirectory = "dir"
        }
    }
    {
        additional_ECA_instances
    }
    ...
]
```

Parameters

Parameters of the edrControlAgent are listed below.

badFileDirectory

Syntax:	`badFileDirectory = "dir"`
Description:	edrControlAgent moves EDR files that it cannot open for processing to this directory.
Type:	String
Optionality:	Required
Default:	`/IN/service_packages/ECA/failed`
Example:	`badFileDirectory = "/IN/service_packages/ECA/failed"`

fileNamePattern

Syntax:	`fileNamePattern = "pattern"`
Description:	The pattern that the edrControlAgent uses to identify EDR files in the input directory.
Type:	String
Optionality:	Required
Default:	`fileNamePattern = "*.edr"`
Notes:	Use the parameter to: • Ensure only EDR files are processed (while other files, such as README files, are left alone) • Enable a specific edrControlAgent instance to select specific EDR files from a common input directory
Example:	`fileNamePattern = "*.edr"`

inputDirectory

Syntax:	`inputDirectory = "dir"`
Description:	The full path of the directory that holds EDRs to be processed by edrControlAgent.
Type:	String

Optionality:	Mandatory
Default:	`/IN/service_packages/ECA/input`
Example:	`inputDirectory = "/IN/service_packages/ECA/input"`

maxIdpsPerSecond

Syntax:	`maxIdpsPerSecond = num`
Description:	The maximum number of IDPs that edrControlAgent sends across the SLEE within one second.
Type:	Integer
Optionality:	Optional, default used if not set
Allowed:	Positive integers. If set to 0 (zero), no throttling is performed.
Default:	0
Example:	`maxIdpsPerSecond = 250`

pluginLibrary

Syntax:	`pluginLibrary = "lib"`
Description:	The ECA plug-in that processes EDRs of a specific type.
Type:	String
Optionality:	Optional, default used if not set
Default:	ECASimplePlugin.so
Notes:	You can only have one plug-in per instance. To run two plug-ins, you must have two edrControlAgents configured in the `ECA` section of **eserv.config**.
Example:	`pluginLibrary = "ECASimplePlugin.so"`

PluginSpecificConfig

Syntax:	`PluginSpecificConfig = { config }`
Description:	Configuration for the library specified in `pluginLibrary` (on page 13).
Type:	Array
Optionality:	Required
Notes:	The detail of this array depends on the plug-in.

Example:	`PluginSpecificConfig = {`
	`  inapServiceKey = 900`
	`  commentChar = "#"`
	`  separatorChar = "|"`
	`  idpParameters = [`
	`  "calledPartyNumber"`
	`  "skip"`
	`  "callingPartyNumber"`
	`  "locationNumber"`
	`  "tbcdExtension 1234"`
	`  "asn1Extension 1234"`
	`  "callDurationDeciseconds"`
	`  ]`
	`  NumberRules = [`
	`  { prefix = "6449", min = 5, remove = 2,`
	`  prepend = "0", resultNoa = 2 }`
	`  ]`

```
            successDirectory =
            "/IN/service_packages/ECA/success"
            failedDirectory =
            "/In/service_packages/ECA/failed"
        }
```

processingDirectory

Syntax:	`processingDirectory = "dir"`
Description:	Before processing the EDR files, edrControlAgent moves the files to the specified directory.
Type:	String
Optionality:	Required
Default:	`/IN/service_packages/ECA/processing`
Notes:	You can use this parameter to enable different instances of edrControlAgent to run on the same machine, while using the same input directory. If there are multiple instances of ECA, then processing directory should be unique for each ECA instance to prevent contention.
Example:	`processingDirectory = "/IN/service_packages/ECA/processing"` `processingDirectory = "/IN/service_packages/ECA/processing2`

sleeInterfaceName

Syntax:	`sleeInterfaceName = "name"`
Description:	The unique identifier of this instance of the edrControlAgent interface in **SLEE.cfg**.
Type:	Integer
Optionality:	Required
Default:	edrControlAgent
Notes:	Must match the unique identifier of edrControlAgent in the **SLEE.cfg** file. For more information about **SLEE.cfg**, see *Service Logic Execution Environment Technical Guide*.
Example:	`sleeInterfaceName = "edrControlAgent"`

sleeServiceKey

Syntax:	`sleeServiceKey = skey`
Description:	The service key to use in outgoing InitialDPs.
Type:	Integer
Optionality:	Required
Default:	900
Notes:	Must match the SERVICEKEY entry for the edrControlAgent (slee_acs on install) in **SLEE.cfg**. For more information about **SLEE.cfg**, see *Service Logic Execution Environment Technical Guide*. Set to 900 at installation.
Example:	`sleeServiceKey = 900`

statisticsEnabled

Syntax:	`statisticsEnabled = true|false`
Description:	Defines whether edrControlAgent logs statistics about its processing to the SMS statistics sub-system.
Type:	Integer

Optionality:	Optional, default used if not set.
Allowed:	true, false
Default:	true
Notes:	
Example:	`statisticsEnabled = false`

`tssf`

Syntax:	`tssf = seconds`
Description:	The number of seconds edrControlAgent waits for a response before abandoning the IDP and closing the dialog.
Type:	Integer
Optionality:	Optional, default used if not set.
Allowed:	
Default:	30
Notes:	If the plug-in requires it, edrControlAgent increments a statistic count when a message times out.
Example:	`tssf = 10`

edrSimplePlugin.so

The `PluginSpecificConfig` section of the `ECA` **eserv.config** configuration supports these parameters for **edrSimplePlugin.so**.

```
PluginSpecificConfig = {
    inapServiceKey = key
    commentChar = "str"
    separatorChar = "str"
    idpParameters = [
        "str"
        ...
    ]
    NumberRules = [
        { [prefix="str", ][min=int, ][max=int, ] remove=int[, replace=str][,
        prepend="str"][, resultNoa=int] }
        ...
    ]
    successDirectory = "dir"
    failedDirectory = "dir"
}
```

The parameters are described in detail below.

`commentChar`

Syntax:	`commentChar = "char"`
Description:	The character that signifies comments, which are not processed.
Type:	String
Optionality:	Optional, default will be used if not set.
Allowed:	ASCII characters
Default:	"#"
Notes:	
Example:	`commentChar = "#"`

failedDirectory

Syntax:	`failedDirectory = "dir"`
Description:	When an EDR fails parsing, edrControlAgent writes the EDR to the specified directory.
Type:	String
Optionality:	Mandatory
Allowed:	
Default:	None
Notes:	edrControlAgent writes EDRs that are parsed successfully to the directory specified by the *successDirectory* (on page 17) parameter.
Example:	`failedDirectory = "/var/edr/failed"`

idpParameters

Syntax:	`idpParameters = ["parameters"]`
Description:	The order of fields in the EDR.
Type:	Array of strings
Optionality:	Mandatory
Allowed:	For information about the fields you can use, see *idpParameter details* (on page 16). If fields other than those specified are used, edrControlAgent does not startup.
Default:	None
Notes:	The separator in the EDR file is specified by the *separatorChar* (on page 17) parameter.

Example:	`idpParameters = [`
	`"calledPartyNumber"`
	`"skip"`
	`"callingPartyNumber"`
	`"locationNumber"`
	`"tbcdExtension 1234"`
	`"callDurationSeconds"`
	`]`
	This configuration correctly parses the following EDR:
	`123456789|skip|987654321|123456|490154203237518|123`

idpParameter details

You can specify the following strings for `idpParameters`:

String	Description
skip	The field in this position is irrelevant. Skip it.
callDurationSeconds	Call duration in seconds
callDurationDeciseconds	Call duration in deciseconds
tbcdExtension(<int extension type>)	An IDP extension with the given type, as an octet string. The octet string contains a coded up MAP TBCD-STRING.
calledPartyNumber	IDP.calledPartyNumber
callingPartyNumber	IDP.callingPartyNumber
callingPartysCategory	IDP.callingPartysCategory
locationNumber	IDP.locationNumber
additionalCallingPartyNumber	IDP.additionalCallingPartyNumber

String	Description
redirectingPartyID	IDP.redirectingPartyID
iMSI	IDP.iMSI
mscAddress	IDP.mscAddress
calledPartyBCDNumber	IDP.calledPartyBCDNumber

`inapServiceKey`

Syntax: `inapServiceKey = skey`
Description: The service key for all IDPs generated by this plug-in.
Type: Integer
Optionality: Mandatory
Allowed: Valid IDPs as specified in the relevant standard.
Default: None
Notes: To run some EDRs on a different service key, you must run more than one instance of edrControlAgent and split the EDRs for each process.
Example: `inapServiceKey = 111`

`separatorChar`

Syntax: `separatorChar = "char"`
Description: The character that separates the fields in the EDR.
Type: String
Optionality: Optional, default will be used if not set.
Allowed: ASCII
Default: |
Notes:
Example: `separatorChar = "|"`

`successDirectory`

Syntax: `successDirectory = "dir"`
Description: edrControlAgent moves EDRs that are processed successfully to the specified directory.
Type: String
Optionality: Mandatory
Allowed:
Default: None
Notes:
Example: `successDirectory = "/var/edr/success"`

NumberRules

The `NumberRules` subsection of the `ECA` **eserv.config** configuration supports these parameters. If the `NumberRules` section is not present, all numbers are assumed to be in international format. This section applies to denormalization only.

```
NumberRules = [
```

```
            { [prefix="str", ][min=int, ][max=int, ] remove=int[, replace=str][,
            prepend="str"][, resultNoa=int] }
            ...
        ]
```

The parameters are described in detail below.

max

Syntax:	`max = maxNoLength`
Description:	The maximum number of digits that a number can contain. If the number contains digits less than or equal to this value, the max part of the number rule is met.
Type:	Integer
Optionality:	Optional, (if not set, default it used).
Allowed:	
Default:	999
Notes:	This parameter is an element of the `NumberRules` parameter array.
Example:	`max = 9`

min

Syntax:	`min = minNoLength`
Description:	The minimum number of digits that a number can contain. If the number contains digits that is greater than or equal to this value, the min part of the number rule is met.
Type:	Integer
Optionality:	Optional, if not set default is used.
Allowed:	0 ≤ *minNoLength*
Default:	0
Notes:	• The `remove` parameter affects the `min` parameter. If `remove` is equal to *`noOfRemovedDigits`* and *`noOfRemovedDigits`* is greater than 0, then *`minNoLength`* must be set so *`minNoLength`* is greater than or equal to *`noOfRemovedDigits`*. • This parameter is an element of the `NumberRules` parameter array.
Example:	`min = 5`

prefix

Syntax:	`prefix = "prefix"`
Description:	Contains a digit or digits. Rule attempts to match the first digit or digits of a number with this value. If the digit or digits match, the prefix part of the number rule is met.
Type:	String
Optionality:	Optional
Allowed:	One or more decimal digits.
Default:	
Notes:	This parameter is an element of the `NumberRules` parameter array.
Example:	`prefix = "25"`

prepend

Syntax:	`prepend = "firstDigits"`
Description:	Digits added to the beginning of a number.

Type: String
Optionality: Optional
Allowed: Can be:
- Any combination of decimal digits
- A null string ("")

Default:
Notes:
- If the `remove` and `prepend` parameters are both used in the same number rule, *`firstDigits`* is added to the beginning of the number after the number has been modified by the `remove` parameter.
- This parameter is an element of the `NumberRules` parameter array.

Example: `prepend = "0"`

remove

Syntax: `remove = noOfRemovedDigits`
Description: The number of digits stripped from the beginning of a number.
Type: Integer
Optionality: Mandatory
Allowed:
Default:
Notes:
- The `remove` parameter affects the `min` parameter.
  If `min` is equal to *`minNoLength`* and if *`noOfRemovedDigits`* is greater than 0, then *`minNoLength`* must be set to *`minNoLength`* is greater than or equal to *`noOfRemovedDigits`*.
  See *min* (on page 18).
- The `remove` parameter is an element of the `NumberRules` parameter array.

Example: `remove = 2`

replace

Syntax: `replace = "str"`
Description: Characters that the number rule substitutes for a number.
Type: String
Optionality: Optional
Allowed:
Default:
Notes: This parameter is an element of the `NumberRules` parameter array.
Example: `replace = "111"`

resultNoa

Syntax: `resultNoa = NOA`
Description: The nature of address (NOA) sent to the network after denormalization.
Type: Integer
Optionality: Optional
Allowed:
Default:

Notes:
- A value for `NOA` is typically specified in denormalization rules.
- This parameter is an element of the `NumberRules` parameter array.

Example: `resultNoa = 4`

Example number denormalisation

Example 1

```
{ prefix="027", min=9, remove=1, resultNoa=3 }
```

This denormalization rule:

- Matches numbers that:
  - Start with the digits 027
  - Have a minimum of 9 digits
- Removes the first digit.
- Sets NOA = 3.

For example, the outgoing message 027nnnnnnn is changed to 27nnnnnnn.

Example 2

```
{ prefix="00", min=5, remove=2, prepend="", resultNoa=4 }
```

This denormalization rule:

- Matches numbers that:
  - Start with the digits 00
  - Contain a minimum of 5 digits
- Removes the first two digits.
- Sets NOA = 4.

For example, the outgoing message 00nnnnnnnnnn is changed to nnnnnnnnnn.

Example configuration

An example of the `ECA` section of a **eserv.config** file is listed below. Comments have been removed.

```
ECA = [
    {
        sleeInterfaceName = "EDRControlAgent"
        inputDirectory = "/var/edr/input"
        processingDirectory = "/var/edr/processing"
        badFileDirectory = "/var/edr/unprocessable"
        fileNamePattern = "*.cdr"
        sleeServiceKey = 300
        maxIdpsPerSecond = 250
        statisticsEnabled = true
        tssf = 10
        pluginLibrary = "ECASimplePlugin.so"
        PluginSpecificConfig = {
            inapServiceKey = 111
            commentChar = "#"
            separatorChar = "|"
            idpParameters = [
                "calledPartyNumber"
                "skip"
                "callingPartyNumber"
                "locationNumber"
                "tbcdExtension 1234"
                "callDurationSeconds"
            ]
```

```
            NumberRules = [
                { prefix = "6449", min = 5, remove = 2, prepend = "0", resultNoa = 2
                }
            ]
            successDirectory = "/var/edr/success"
            failedDirectory = "/var/edr/failed"
        }
    }
]
```

Failure

If edrControlAgent stops while processing an EDR file, it writes the following information to **ecaProgress.txt**:

- The names of all the files being processed
- The name of the EDR file currently being processed
- The number of IDPs sent for the current file
- If the plug-in requires it, the file names and EDR number for all the 'calls' in progress

When it restarts, edrControlAgent uses **ecaProgress.txt** to identify where to start again.

If edrControlAgent stops without writing to the **ecaProgress.txt** file, it uses the plug-in to move any files out of the progress directory to the success or failed directory.

Input

edrControlAgent takes EDRs from the input directory configured by the *inputDirectory* (on page 12) parameter in **eserv.config**.

Output

edrControlAgent moves processed EDRs to the success or failed directory depending on the result of the EDR processing. These directory locations are configurable in **eserv.config**.

edrControlAgent also writes error messages to the system messages file, and writes additional output to **/IN/service_packages/ECA/tmp/edrControlAgent.log**

Note: The above are defaults and may vary.

Chapter 4

Troubleshooting

Overview

Introduction

This chapter explains the important processes on each of the server components in NCC, and describes a number of example troubleshooting methods that can help aid the troubleshooting process before you raise a support ticket.

In this chapter

This chapter contains the following topics.

Possible Problems

Introduction

This topic lists common problems and actions you can take to investigate or solve them. This list enables you to check for alarms based on the overall behavior you are experiencing.

Flooding

edrControlAgent may produce more IDPs than the processing applications can cope with. In this circumstance, edrControlAgent waits until the next second to re-send the IDP.

You can throttle the number of IDPs edrControlAgent sends by specifying one of the following:

- A lower *maxIdpsPerSecond* (on page 13)
- A lower MAX_DIALOGS for the edrControlAgent INTERFACE entry in **SLEE.cfg**.

Chapter 5

About Installation and Removal

Overview

Introduction

This chapter provides information about the installed components for the Oracle Communications Network Charging and Control (NCC) application described in this guide. It also lists the files installed by the application that you can check for, to ensure that the application installed successfully.

In this Chapter

This chapter contains the following topics.

Installation and Removal Overview

Introduction

For information about the following requirements and tasks, see *Installation Guide*:

- NCC system requirements
- Pre-installation tasks
- Installing and removing NCC packages

ECA packages

An installation of Oracle Communications Network Charging and Control EDR Control Agent includes the following packages, on the:

- SMS:
  - ecaSms
- SLC:
  - ecaScp

Checking the Installation

Introduction

Refer to these checklists to ensure that ECA installed correctly.

Checklist - SMS

Follow the steps in this checklist to ensure ECA installed correctly on an SMS machine.

Step	Action
1	Log in to SMS machine as root.
2	Check that the following directory structure exists, with subdirectories: **/IN/service_packages/ECA**
3	Check that directories contain subdirectories and that all are owned by: smf_oper user (group esg)

Checklist - SLC

Follow the steps in this checklist to ensure that ACS installed correctly on an SLC machine.

Step	Action
1	Log in to SLC machine as root.
2	Check that the following directory structure exists, with subdirectories: **/IN/service_packages/ECA**
3	Check that the directory contains subdirectories and that all are owned by: smf_oper user (group esg)
4	Check that the processes listed in the process lists are running. For a list of the processes that should be running, see *Process list - SLC* (on page 26).

Process list - SLC

If the application is running correctly, the following process should be running on each SLC:

- Started during SLEE startup:
  - edrControlAgent

Post-installation Configuration

Configuration process overview

This table describes the steps involved in configuring ECA for the first time.

Stage	Description
1	Uncomment (and if necessary update) the default SLEE configuration for the ECA in the **SLEE.cfg** file. For more information, see *Service Logic Execution Environment Technical Guide*.
2	The **eserv.config** file must be configured for ECA. The installation script adds an `ECA` section to **eserv.config**. Any required configuration should be updated. For more information, see **eserv.config** *Configuration* (on page 7).