

CAI3G Implementation

Ericsson Dynamic Activation 1

INTERFACE DESCRIPT

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1 Introduction

This document describes synchronous CAI3G implementation in Ericsson™ Dynamic Activation (EDA).

Customer Administration Interface Third Generation (CAI3G) is a synchronous provisioning interface based on Simple Object Access Protocol (SOAP). This is further described in document *Generic CAI3G Interface 1.2*, Reference [1].

Dynamic Activation implements CAI3G as its provisioning interface which extends generic CAI3G, but is not fully compliant to the generic interface in some points.

2 Extensions to CAI3G Interface

The `Context` element is supported in CAI3G request header.

3 Deviations from the CAI3G Interface

The following subsections hold information about deviations from the CAI3G interface.

3.1 SequenceId Is Not Enforced

The `sequenceId` element is supported in CAI3G request header, but currently it is not enforced in Dynamic Activation for the coming CAI3G request. Dynamic Activation does not have a verification on this value.



3.2 TransactionId Is Not Enforced

The `TransactionId` element is supported in CAI3G request header, but currently it is not enforced in Dynamic Activation for the coming CAI3G request. Dynamic Activation does not have a verification on this value.

3.3 Final Parameter

The `final` parameter is not used in the header type definitions in the Dynamic Activation schema files, for example. `headerfault`, despite being part of the **Generic CAI3G 1.2** interface, see *Generic CAI3G Interface 1.2*, Reference [1].

As an example, see first row `<xs:complexType name="SessionIdFault" final="restriction">`:

```
<xs:complexType name="SessionIdFault" final="restriction">
  <xs:complexContent>
    <xs:extension base="HeaderFaultType">
      <xs:sequence>
        <xs:element name="faultcode">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="Invalid SessionId"/>
              <xs:enumeration value="Session Timeout"/>
              <xs:enumeration value="SessionId Syntax Error"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

3.4 Element Instead of Type

The `element` attribute is used instead of the `type` attribute for certain header type definitions. This is because of code validation and generation tools not having support for type definitions.

As an example, see first row `<xs:element name="SessionIdFault">`:



```
<xs:element name="SessionIdFault">
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="HeaderFaultType">
        <xs:sequence>
          <xs:element name="faultcode">
            <xs:simpleType>
              <xs:restriction base="xs:string">
                <xs:enumeration value="Invalid SessionId"/>
                <xs:enumeration value="Session Timeout"/>
                <xs:enumeration value="SessionId Syntax Error"/>
              </xs:restriction>
            </xs:simpleType>
          </xs:element>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
```

4 CAI3G Implementation

This section holds information about the CAI3G implementation.

4.1 CAI3G Versions

The following is supported:

- CAI3G version 1.2.
- SOAP version 1.1, see <http://schemas.xmlsoap.org/soap/envelope/>
- WSDL version 1.2, see <http://schemas.xmlsoap.org/wsdl/>
- XML schema version 2001, see <http://www.w3.org/2001/XMLSchema>

4.2 CAI3G Operation

The following table lists supported CAI3G operations in Dynamic Activation versions respectively:

Table 1 CAI3G Operation for Dynamic Activation

Operation	Supported
Create	Yes
Set	Yes



Operation	Supported
Get	Yes
Delete	Yes
Search	No
Notify	No
Subscribe	No
Unsubscribe	No
<extension>	Yes

4.3 Schema Validation

The following table holds information about schema validation:

Table 2 Schema Validation

Item	Validation	Comment
MOType	Yes	If the MOType value is not correct, Dynamic Activation fails to route the request.
MOId	No	Dynamic Activation accepts the following formats so far: <subscriberId>1234567890</subscriberId> <subscriberId xmlns=http://...>1234567890</subscriberId> Dynamic Activation forces MOId contents to be same as MOAttributes identities logically
MOAttributes	Yes	It must follow the specific MOAttributes XML schema. Only the request and is validated in Dynamic Activation regarding the specified XML schema

4.4 Security

The following subsections hold information about CAI3G security methods.

4.4.1 User Authentication

The following table holds information regarding user authentication:



Table 3 User Authentication

Authentication	Comment
User/Password	For the HTTP SOAP protocol, the client is required to log on to Dynamic Activation CAI3G server with user and password. A sessionId is returned as the CAI3G provisioning request token for later requests. The session expires after some time if not used. The session management is centrally controlled in the Dynamic Activation server.
WS-security	Not supported.

4.4.2 Traffic Encryption

The Dynamic Activation CAI3G agent supports Hypertext Transfer Protocol over Secure Socket Layer (HTTPS) for traffic encryption. The CAI3G manager is able to use HTTPS on the specific port with default Secure Socket Layer (SSL) certification or its own certification.

For details on how to deploy CAI3G SSL certification, refer to *System Administrators Guide for Native Deployment*, Reference [2] for Native deployment, or *System Administrators Guide for Virtual and Cloud Deployment*, Reference [3] for Virtual deployment.

HTTPS is suggested to be used together above CAI3G authentication mechanism to protect user information from being eavesdropped.

4.5 SOAP HTTP

The following subsections hold information about SOAP HTTP implantation in Dynamic Activation.

4.5.1 SOAP Action

The header field of a SOAPAction HTTP request is used for indicating the CAI3G operation of the SOAP HTTP request. It is defined in each specific provisioning WSDL file. This header field is optional, and is not enforced to be used by the client.

4.5.2 Content-Length

Generally HTTP 1.1 requires a message-body that must include a valid Content-Length for compatibility with HTTP 1.0 applications. For requests, all HTTP 1.1 clients must accept the `chunked` Transfer-Encoding, which is used for message when the message length cannot be determined in advance.



4.5.3 Keep-Alive

HTTP keep-alive connections are closed by Dynamic Activation when 100 HTTP requests has been executed, or when the connection has been idle for 5 seconds.

4.5.4 Response Status Codes

Successful SOAP operations are using HTTP response status code 200 (OK), and 500 (Internal Server Error), when the response contains a SOAP Fault.

4.6 SOAP JMS

SOAP JMS is not supported in Dynamic Activation.

4.7 Session Id

The `sessionId` is the system unique session identifier automatically generated by Dynamic Activation. The generated `sessionId` is replicated to all payload nodes before it is returned to the CAI3G Manager.

A `sessionId` is valid at least 10 minutes after its last provisioning operation. The idle time-out can vary depending on internal timers. At most it can be valid up to 16 minutes.

5 CAI3G Fault Response

The SOAP `Fault` element is used to hold error or status information within a CAI3G response. It includes `Cai3gFault` and details about the fault.

5.1 CAI3G Fault Codes

The following table lists all current implemented CAI3G fault codes in Dynamic Activation. Severity of these fault codes and suggested action to recover them are provided in the table. The meaning of each severity is identified as following.

- Minor: Can be fixed by modifying the request command, GUI configuration, and so on.



- Major: Can be fixed by restarting Dynamic Activation component, installing new license, and so on. These errors can cause disturbance to provisioning. Cost to identify and fix these problems can be high.
- Critical: Unidentified system error. Can cause provisioning service temporarily unavailable. Cost to identify and fix these problems is high.

The following table holds information about the implemented CAI3G fault codes.

Table 4 CAI3G Fault Codes

Fault Code	Source	Fault Reason	Comment	Severity
1001	Client	Invalid SessionId	Log in before sending any CAI3G provisioning requests	Minor
2001	Client	Invalid managed object type	Ensure the MoType in the request is correct. If the problems are not solved, ensure that required Dynamic Activation components and licenses are correctly installed	Minor
2002	Client	Invalid managed object id	Ensure the Mold in the request is correct. If the problems are not solved, ensure that required Dynamic Activation components and licenses are correctly installed	Minor
2003	Client	Unsupported data type	Ensure that the Namespace in the request is correct. If the problems are not solved, ensure that required Dynamic Activation components and licenses are correctly installed	Minor
2999	Client	Request error that cannot be put into above categories	Call for support	Major
3001	Client	Operation is not allowed because of the prerequisites are not fulfilled	Ensure that the user is allowed to perform this operation and the operation is allowed for the MO	Minor
3002	Client	Try to access an non-existent MO instance	Ensure the MOld in the request is correct	Minor
3013	Client	There are invalid parameters in the request	Refer to document Generic CAI3G Interface 1.2 and the schema files on the PL blade in the /home/dveinstaller/da directory for correct syntax of SessionId, MoType, ManagerRef, and so on	Minor
3014	Client	Logon Failure, invalid username, invalid password	Contact Dynamic Activation administrator for correct UserId and password	Minor
3999	Client	Client error that cannot be put into above categories	Call for support	Critical
4001	Server	CAI3GAgent cannot support the operation in current request	Refer to WSDL of the CAI3G Web Service provided by the CAI3G server and the schema files on the PL blade in the /home/dveinstaller/da directory for mandatory parameters in CAI3G request	Minor



Table 4 CAI3G Fault Codes

Fault Code	Source	Fault Reason	Comment	Severity
4004	Server	A temporary error caused by short of computing resource at CAI3GAgent	Try later. If it happens frequently, check the downstream Network Element status	Major
4005	Server	A fatal error in CAI3GAgent when processing the request	Call for support	Critical
4006	Server	An error caused outside the CAI3GAgent causes the end of the processing request	Check the downstream Network Element status	Critical
4010	Server	Over limitation of maximum numbers of CAI3G sessions	Reduce traffic, try later, or contact your local support organization to increase the maximum number of CAI3G sessions.	Minor
4999	Server	Server error that cannot be put into any above categories	Call for support	Critical

5.2 Dynamic Activation Fault Types

The `details` element in the `Cai3gFault` is used to hold information about the Dynamic Activation error details.

The following table covers all Fault Types that are handled in Dynamic Activation:

Table 5 List of Fault Types

Fault Type	Namespace	Service
AVGFault	http://schemas.ericsson.com/pg/1.0	AVG
EPSFault	http://schemas.ericsson.com/pg/1.0	EPS
FaultDetails	http://schemas.ericsson.com/ma/	M2M
IMSFault	http://schemas.ericsson.com/ma/HSS/	IMS
PGFault	http://schemas.ericsson.com/pg/1.0	ALL
UserProvisioningFault ⁽¹⁾	http://schemas.ericsson.com/ema/UserProvisioning/	MTAS, IPWorks/ENUM, MNP, HLR, AUC

(1) This Fault type does not use the standard elements described in Table 6, it uses the elements `respCode` and `respDescription`

The following table covers the elements that can be included in a Fault type.

Table 6 List of Fault Type Elements

Element name	Type	Occurrence
errorcode	Int	Mandatory



Table 6 List of Fault Type Elements

Element name	Type	Occurrence
errormessage	String	Mandatory
errordetails	String	Optional

5.3 General Dynamic Activation Internal Error Codes

The following table lists all Dynamic Activation internal error codes. They can appear in any CAI3G fault respons.

Table 7 General Dynamic Activation Internal Error Codes

Error Code	Error Message
1001	Invalid resource ID
1002	Invalid XPath
1003	Unrecognized namespace. No data view associated
1004	Access denied. Invalid principal or credentials
1005	Not authorized to perform current operation on selected data view
1006	Invalid parameter
1007	Unsupported operation
1010	Invalid session ID
1011	Target is not found
1095	Communication error while interacting with a data repository
1096	Time-out expired during wait for answer from data repository
1097	Failure during processing of the request
1098	Could not process request because of resource limitation
1099	System error
1101	External error
1103	License error
1104	Routing error
1105	NE Group error
1106	Async request is deleted by GUI operation
2001	Format error
2002	Unreasonable value
2003	Function busy
2004	Database update error
2005	Storage shortage in log data file
2006	Partly executed, HLR ID <ID> failed
2007	Unknown HLR ID





Reference List

Ericsson Documents

- [1] *Generic CAI3G Interface 1.2*, 2/155 19-FAY 302 0003 Uen
- [2] *System Administrators Guide for Native Deployment*, 1/1543-CSH 109 628 Uen
- [3] *System Administrators Guide for Virtual and Cloud Deployment*, 3/1543-CSH 109 628 Uen