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Location-switch for Call Processing Language (CPL)

Status of this Memo

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Abstract

This document introduces two switch nodes named location-switch and location-relation-switch to the Call Processing Language (CPL). The new nodes enable CPL to handle location-based services.

Contents

1 Introduction

The Call Processing Language (CPL) [1] is a language that can be used to describe and control Internet telephony services. CPL uses switch nodes to check call conditions so as to make call control decisions. This document introduces two new switch nodes named location-switch and location-relation-switch. The new switch nodes check people's physical locations and based on the location information to make call control decisions.

Numerous applications today can get and share location information. Location information may affect people on making call control decisions. For example, in a place requiring quiet environment, it is preferred to reject phone calls. There are two types of location information. One is to describe location attributes, such as privacy preference of a location. The other is to define physical locations, such as geographical coordinates, or civil addresses. Both types of location information can be encapsulated into XML-based Presence Information Data Format (PIDF [6]). The encapsulation of location attributes is defined in RPID – Rich Presence Information Data Format [7]. The encapsulation of physical location information is defined in Presence-based GEOPRIV Location Object Format [8]. The switch nodes defined in this document are used to handle physical location information. The location attribute handling should be defined in different switch nodes.

1.1 Conventions of This Document

In this document, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in RFC 2119 [2].

2 Terminology

This document uses the terms defined in [1]. We list additional definitions that are related to location switches below:

Location occupier: A person whose current location will be matched against the location specified in a location-switch.

Script owner: For a location-switch, script owner refers to the person who owns the CPL script that contains the location-switch.

Location relation: The relationship between two persons regarding their physical locations. The relationship can be the distance between two persons, or the relative positions between two persons, e.g., person A is south of person B.

3 Location Switches

Location switches allow a CPL script to make call decisions based on the physical location of a location occupier. They are summarized in Figure 1.

Location switches have two node parameters: The mandatory parameter `type` specifies the location type to match: either geospatial location, or civil location. The optional parameter `uri` specifies the location occupier's uri. If not provided, the location occupier will be the script owner.

Node:	location-switch	
Outputs:	location	Specific location to match
Parameters:	type	geospatial, civil
	uri	the location occupier's uri
Output:	location	
Parameters:	longitude	Longitude coordinates, valid only for geospatial type
	latitude	Latitude coordinates, valid only for geospatial type
	altitude	Altitude coordinates, valid only for geospatial type
	country	Country of the location, valid only for civil type
	A1	National subdivisions (state, region, province, prefecture), valid only for civil type
	A2	County, parish, gun (JP), district (IN), valid only for civil type
	A3	City, township, shi (JP), valid only for civil type
	A4	City division, borough, city district, ward, chou (JP), valid only for civil type
	A5	neighborhood, block, valid only for civil type
	A6	street, valid only for civil type
	PRD	Leading street direction, valid only for civil type
	POD	Trailing street suffix, valid only for civil type
	STS	Street suffix, valid only for civil type
	HNO	House number, numeric part only, valid only for civil type
	HNS	House number suffix, valid only for civil type
	LMK	Landmark or vanity address, valid only for civil type
	LOC	Additional location information, such as room valid only for civil type
	FLR	Floor, valid only for civil type
	NAM	Name (residence, business or office occupant) valid only for civil type
	PC	Postal code, valid only for civil type
	distance	Distance value to a specified location. Valid only if geospatial or civil location presented.
	condition	Valid only if distance presented. Value is (in|out|at|). Default value is "at".
	unit	Valid only if distance presented. Value is (m|km|mi|in|ft|yd|naut mi). Default value is "m".
	direction	Direction relative to a specified location, Valid only if geospatial or civil location presented. Value is "(south|north|west|east|above|below)".

Figure 1: Syntax of the location-switch node

The location output tag may have one or more parameters, indicating the exact location to match.

The longitude, latitude, and altitude are used to specify a geographical location. The country, A1, A2, A3, A4, A5, A6, PRD, POD, STS, HNO, HNS, LMK, LOC, FLR, NAM, and PC are used to specify a civil location.

The distance parameter cannot be used without geographical location or civil location specified. Usually, the distance parameter is used with geographical location since it is difficult to meature the distance to a civil location. The condition and unit parameters are used to provide more convinient ways for distance specification. The available unit values are (m|km|mi|in|ft|yd|naut mi), mapped to meter, kilometer, mile, inch, foot, yard, and nautical mile, accordingly.

The direction parameter cannot be used without geographical location or civil location specified. The value south or north are usually used when latitude specified. The value east or west are usually used when longitude specified. The value above and below are usually used when altitude specified, or FLR sepcified.

4 Location-relation Switches

Location-relation switches allow a CPL script to make call decisions based on the location relation of two persons. They are summarized in Figure 2.

Node:	location-relation-switch	
Outputs:	location-relation	Specific location relation to match
Parameters:	uri1	the first location occupier's uri
	uri2	the second location occupier's uri
Output:	location-relation	
Parameters:	distance	Distance value between two persons.
	condition	Valid only if distance presented. Value is (in|out|at|). Default value is "at".
	unit	Valid only if distance presented. Value is (m|km|mi|in|ft|yd |naut mi). Default value is "m".
	direction	Direction relation between two persons, value is "(south|north| west|east|above|below)".
	same	A space separated list containing location attributes, e.g., LOC, that two persons have the same value.
	difference	A space separated list containing location attributes, that two persons have different values.

Figure 2: Syntax of the location-relation-switch node

Location-relation switches have two node parameters: The mandatory parameter uri1 specifies the first location occupier's uri. The optional parameter uri2 specifies the second location occupier's uri. If not provided, the second location occupier will be the script owner.

The location-relation output tag may have one or more parameters, indicating the exact relation to match.

The distance parameter indicates the distance between two persons. The condition and unit parameters are used for distance measuring. They have the same meanings as those defined in location-switch.

The direction parameter indicates relative positions between two persons. For example, south means uri1 is south of uri2.

The same and difference indicating the relationship between two persons' location attributes. The attributes can be geospatial location attributes, such as longitude, latitude, and altitude. They can also be civil location attributes, such as country, A1, A2, A3, A4, A5, A6, PRD, POD, STS, HNO, HNS, LMK, LOC, FLR, NAM, and PC.

5 IANA Considerations

This document registers a new URN per RFC 2141 [3], RFC 2648 [4], and RFC 3688 [5].

5.1 URN Sub-Namespace Registration for urn:ietf:params:xml:ns:cpl:location-switch

URI: urn:ietf:params:xml:ns:cpl:location-switch

Registrant Contact: Xiaotao Wu <xiaotaow@cs.columbia.edu>
Henning Schulzrinne <hgs@cs.columbia.edu>

XML:
```
BEGIN
<?xml version="1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML Basic 1.0//EN"
    "http://www.w3.org/TR/xhtml-basic/xhtml-basic10.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <meta http-equiv="content-type"
     content="text/html;charset=iso-8859-1"/>
  <title>Call Processing Language location-switch Namespace
</title>
</head>
<body>
  <h1>Namespace for Call Processing Language location-switch</h1>
  <h2>urn:ietf:params:xml:ns:cpl:location-switch</h2>
  <p><a href="[[[URL of published RFC]]]">RFCXXXX</a>.</p>
</body>
</html>
END
```

5.2 Schema registration

This specification registers XML Schema for CPL location-switch, and location-relation-switch, as per the guidelines in [5].

URI: please assign.

Registrant contact:
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XML: The XML can be found in Section A.

6 Examples

The script in Figure 3 is a simple script which reject all calls when the script owner is in conference-room.

```
<?xml version="1.0" encoding="UTF-8"?>
<cpl xmlns="urn:ietf:params:xml:ns:cpl"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:ietf:params:xml:ns:cpl cpl.xsd
    urn:ietf:params:xml:ns:cpl:location-switch location-switch.xsd">
  <incoming>
    <location-switch type="civil">
      <location LOC="conference-room">
        <reject status="busy"/>
      </location>
    </location-switch>
  </incoming>
</cpl>
```

Figure 3: Example Script: Location based call rejection

The script in Figure 4 checks the location relation between the script owner and sip:bob@examples.com, when it receives an event notification showing that sip:bob@examples.com is online. If they are at the same floor, the script will call sip:bob@examples.com.

A The XMl Schema for CPL location-switch and location-relation-switch

This section includes an XML schema describing the XML syntax of CPL location-switch and location-relation-switch. The schema is based on the XML schema for CPL.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:ietf:params:xml:ns:cpl:location-switch"
  xmlns="urn:ietf:params:xml:ns:cpl:location-switch"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
```

```
<?xml version="1.0" encoding="UTF-8"?>
<cpl xmlns:="urn:ietf:params:xml:ns:cpl:location-switch"
  xmlns:CPL="urn:ietf:params:xml:ns:cpl"
  xmlns:EVENT="urn:ietf:params:xml:ns:cpl:event"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:ietf:params:xml:ns:cpl cpl.xsd
    urn:ietf:params:xml:ns:cpl:event event.xsd
    urn:ietf:params:xml:ns:cpl:location-switch locswitch.xsd">
  <EVENT:notification>
    <CPL:address-switch>
      <CPL:address is="sip:bob@examples.com">
        <EVENT:event-switch>
          <EVENT:event is="open">
            <location-relation-switch uri1="sip:bob@examples.com">
              <location-relation distance="10" same="FLR">
                <CPL:location url="sip:bob@examples.com">
                  <call/>
                </CPL:location>
              </location-relation>
            </location-relation-switch>
          </EVENT:event>
        </EVENT:event-switch>
      </CPL:address>
    </CPL:address-switch>
  </EVENT:notification>
</cpl>
```

Figure 4: Example Script: Location based call

```
  xmlns:CPL="urn:ietf:params:xml:ns:cpl"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  <xs:import namespace="urn:ietf:params:xml:ns:cpl"
      schemaLocation="cpl.xsd"/>
  <xs:complexType name="LocationSwitchType">
    <xs:sequence>
      <xs:element name="location" type="LocationType" minOccurs="0"
          maxOccurs="unbounded"/>
      <xs:sequence minOccurs="0">
        <xs:element name="not-present" type="CPL:NotPresentAction"/>
        <xs:element name="location" type="LocationType" minOccurs="0"
            maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:element name="otherwise" type="CPL:OtherwiseAction"
          minOccurs="0"/>
```

```
    </xs:sequence>
    <xs:attribute name="type" use="required">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="geospatial"/>
          <xs:enumeration value="civil"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="uri" type="xs:anyURI"/>
  </xs:complexType>
  <xs:element name="location-switch" type="LocationSwitchType"
      substitutionGroup="CPL:switch"/>
  <xs:complexType name="LocationType">
    <xs:group ref="CPL:Node"/>
    <xs:attribute name="longitude" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            geospatial</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="latitude" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            geospatial</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="altitude" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            geospatial</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="A1" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="A2" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
```

```
    <xs:attribute name="A3" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="A4" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="A5" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="A6" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="PRD" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="POD" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="STS" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="HNO" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
```

```
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="HNS" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="LMK" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="LOC" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="FLR" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="NAM" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="PC" type="xs:string">
      <xs:annotation>
        <xs:documentation>Valid only if type is
            civil</xs:documentation>
      </xs:annotation>
    </xs:attribute>
    <xs:attribute name="distance">
      <xs:annotation>
        <xs:documentation>Valid only if geospatial or civil location
            presented</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
```

```
        <xs:restriction base="xs:decimal">
          <xs:minInclusive value="0"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="condition" default="at">
      <xs:annotation>
        <xs:documentation>Valid only if distance
            presented</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="in"/>
          <xs:enumeration value="out"/>
          <xs:enumeration value="at"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="unit" default="m">
      <xs:annotation>
        <xs:documentation>Valid only if distance
            presented</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="m"/>
          <xs:enumeration value="km"/>
          <xs:enumeration value="mi"/>
          <xs:enumeration value="in"/>
          <xs:enumeration value="ft"/>
          <xs:enumeration value="yd"/>
          <xs:enumeration value="naut mi"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="direction">
      <xs:annotation>
        <xs:documentation>Valid only if geospatial or civil location
            presented</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="south"/>
          <xs:enumeration value="north"/>
          <xs:enumeration value="east"/>
```

```
          <xs:enumeration value="west"/>
          <xs:enumeration value="above"/>
          <xs:enumeration value="below"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
  <xs:complexType name="LocationRelationSwitchType">
    <xs:sequence>
      <xs:element name="location-relation"
          type="LocationRelationType" minOccurs="0"
          maxOccurs="unbounded"/>
      <xs:sequence minOccurs="0">
        <xs:element name="not-present" type="CPL:NotPresentAction"/>
        <xs:element name="location-relation"
            type="LocationRelationType" minOccurs="0"
            maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:element name="otherwise" type="CPL:OtherwiseAction"
          minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="uri1" type="xs:anyURI" use="required"/>
    <xs:attribute name="uri2" type="xs:anyURI"/>
  </xs:complexType>
  <xs:element name="location-relation-switch"
      type="LocationRelationSwitchType"
      substitutionGroup="CPL:switch"/>
  <xs:simpleType name="LocationAttributes">
    <xs:restriction base="xs:string">
      <xs:enumeration value="latitude"/>
      <xs:enumeration value="longitude"/>
      <xs:enumeration value="altitude"/>
      <xs:enumeration value="country"/>
      <xs:enumeration value="A1"/>
      <xs:enumeration value="A2"/>
      <xs:enumeration value="A3"/>
      <xs:enumeration value="A4"/>
      <xs:enumeration value="A5"/>
      <xs:enumeration value="A6"/>
      <xs:enumeration value="PRD"/>
      <xs:enumeration value="POD"/>
      <xs:enumeration value="STS"/>
      <xs:enumeration value="HNO"/>
      <xs:enumeration value="HNS"/>
```

```
      <xs:enumeration value="LMK"/>
      <xs:enumeration value="LOC"/>
      <xs:enumeration value="FLR"/>
      <xs:enumeration value="NAM"/>
      <xs:enumeration value="PC"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="LocationRelationType">
    <xs:group ref="CPL:Node"/>
    <xs:attribute name="distance">
      <xs:annotation>
        <xs:documentation>Valid only if geospatial or civil location
            presented</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:decimal">
          <xs:minInclusive value="0"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="condition" default="at">
      <xs:annotation>
        <xs:documentation>Valid only if distance
            presented</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="in"/>
          <xs:enumeration value="out"/>
          <xs:enumeration value="at"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="unit" default="m">
      <xs:annotation>
        <xs:documentation>Valid only if distance
            presented</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="m"/>
          <xs:enumeration value="km"/>
          <xs:enumeration value="mi"/>
          <xs:enumeration value="in"/>
          <xs:enumeration value="ft"/>
```

```
          <xs:enumeration value="yd"/>
          <xs:enumeration value="naut mi"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="direction">
      <xs:annotation>
        <xs:documentation>Valid only if geospatial or civil location
            presented</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="south"/>
          <xs:enumeration value="north"/>
          <xs:enumeration value="east"/>
          <xs:enumeration value="west"/>
          <xs:enumeration value="above"/>
          <xs:enumeration value="below"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="same">
      <xs:simpleType>
        <xs:list itemType="LocationAttributes"/>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="difference">
      <xs:simpleType>
        <xs:list itemType="LocationAttributes"/>
      </xs:simpleType>
    </xs:attribute>
    <xs:anyAttribute namespace="##other" processContents="lax"/>
  </xs:complexType>
</xs:schema>
```

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