SCIM and vCard mapping
draft-greevenbosch-scim-vcard-mapping-04

Abstract

   This document defines a mapping between SCIM and vCard.

Note

   Discussion and suggestions for improvement are requested, and should
   be sent to scim@ietf.org.

Status of this Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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1. Introduction

   The SCIM core schema [I-D.ietf-scim-core-schema] defines a platform
   neutral data and extension model for representing users of cloud
   services. SCIM core also defines XML and JSON serialisations of the
   abstract schema.

   This document defines a mapping between SCIM and vCard [RFC6350].
   The mapping may serve several purposes:

   o To provide a unified conversion mechanism between SCIM and vCard.

   o To identify properties that are defined in vCard, but are missing
      in SCIM.

   o To identify SCIM attributes that may be useful in vCard too.

2. Requirements notation

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].

3. Mapping from SCIM to vCard

   When mapping SCIM attributes to vCard, they may either become mapped
   to vCard properties or to vCard attribues associated with vCard
   properties.   Section 3.1 defines the mappings to the vCard
   properties, whereas Section 3.2 defines mappings to vCard attributes.

   In addition, in accordance to [RFC6350], the vCard representation
   MUST include the mandatory fields:

   o VERSION

   o FN

3.1. Mapping of SCIM attributes to vCard properties

   Table 1 describes a mapping from SCIM attributes to the vCard
   properties.

   In the table, the cardinality of the SCIM attribute is prefixed by an
   "S", whereas the cardinality of the vCard property is prefixed by a
   "v". The further notation has been adopted from [RFC6350] as
   follows:

```
        +-------------+---------------------------------------+
        |      1      | Exactly one instance MUST be present. |
        |     *1      | Exactly one instance MAY be present.   |
        |     1*      | One or more instances MUST be present. |
        |      *      | One or more instances MAY be present.  |
        +-------------+---------------------------------------+
```

   SCIM fields that have no vCard equivalent MUST be omitted in the
   vCard result.

   The reverse mapping from vCard to SCIM is defined in Section 4.   The
   reason for having two tables is that some mappings are not
   invertible.

SCIM attribute	vCard property	Cardinality	Notes
active		S*1	

addresses	ADR	S* v*	See [RFC6350] for the internal coding of the ADR property.
addresses/country	ADR (country)	S* v*	Combined with other address attributes into a single ADR element.
addresses/formatted	ADR (LABEL)	S* v*	
addresses/locality	ADR (locality)	S* v*	Combined with other address attributes into a single ADR element.
addresses/postalCode	ADR (postal code)	S* v*	Combined with other address attributes into a single ADR element.
addresses/region	ADR (region)	S* v*	Combined with other address attributes into a single ADR element.

addresses/streetAddress	ADR (street address)	S* v*	Combined with other address attributes into a single ADR element.
costCenter		S*1	
department	ORG	S*1 v*	Use the hierarchical order defined in vCard.
displayName		S*1	
division	ORG	S*1 v*	Use the hierarchical order defined in vCard.
emails	EMAIL	S* v*	See Table 2 for the conversion of a possible "type" attribute.
employeeNumber		S*1	
entitlements		S*	Hard to map as it is proprietary by nature.
externalId		S*1	
groups/value		S*	ID of the group
groups/$ref		S*	URI of the group

id	UID	S1 v*1	See Section 5 for conversion from SCIM id space to vCard UID space.
ims	IMPP	S* v*	
locale		S*1	
manager/displayName		S*1	This field is optional in SCIM, also when "manager" is included.
manager/id		S*1	SCIM specific ID, related to "id" attribute. The vCard RELATED property could be used, but a TYPE "manager" may need definition. In SCIM, "managerID" is mandatory if "manager" is included.
manager/$ref		S*1	The URI of the SCIM resource representing the User's manager.

members/value	MEMBER	S* v*	Contains the IDs of the SCIM resources associated with the members of the group.
members/$ref	MEMBER	S* v*	Contains the URIs of the SCIM resources associated with the members of the group.
meta/created		S*1	
meta/lastModified	REV	S*1 v*1	
meta/location		S*1	No direct vCard equivalent. Candidates could be SOURCE and ORG-DIRECTORY.
meta/resourceType		S*1	
meta/version		S*1	
name/familyName	N (family names)	S*1 v*1	Combined with other name attributes in a single N element.
name/formatted	FN	S*1 v1*	

name/givenName	N (given names)	S*1 v*1	Combined with other name attributes in a single N element.
name/honorificPrefix	N (honorific prefixes)	S*1 v*1	Combined with other name attributes in a single N element.
name/honorificSuffix	N (honorific suffixes)	S*1 v*1	Combined with other name attributes in a single N element.
name/middleName	N (additional names)	S*1 v*1	
nickName	NICKNAME	S*1 v*	
organization	ORG	S*1 v*	Use the hierarchical order defined in vCard.
password		S*1	
phoneNumbers (no type)	TEL (no TYPE)	S* v*	
phoneNumbers (type="fax")	TEL (TYPE="fax")	S* v*	
phoneNumbers (type="home")	TEL (TYPE="voice,home")	S* v*	
phoneNumbers (type="mobile")	TEL (TYPE="voice,cell")	S* v*	

phoneNumbers (type="other")	TEL (no TYPE)	S* v*	
phoneNumbers (type="pager")	TEL (TYPE="pager")	S* v*	
phoneNumbers (type="work")	TEL (TYPE="voice,work")	S* v*	
photos	PHOTO	S* v*	URL of a web location where the photo can be retrieved.
preferredLanguage	LANG	S*1 v*	Language tag according to [RFC5646].
profileUrl	URL	S*1 v*	Multiple fields in SCIM better?
roles	ROLE	S* v*	Consider distinction with the "userType" attribute.
timezone	TZ	S*1 v*	
title	TITLE	S*1 v*	
userName		S1	
userType	ROLE	S*1 v*	Consider distinction with the "roles" attribute.
x509Certificates	KEY	S* v*	Care is required: keys may not have the same usage.

                     Table 1: SCIM to vCard mapping

3.2. Mapping of SCIM attributes to vCard parameters

   In addition to SCIM properties, SCIM attributes may also need to be
   converted to vCard parameters. Table 2 contains the related
   mappings.

SCIM attribute	SCIM value	vCard parameter	vCard value	Notes
primary	true	PREF	1	
primary	false			Omitted in vCard.
type	aim	TYPE	x-aim	Only for "ims"
type	fax	TYPE	fax	May be combined with other types in vCard
type	gtalk	TYPE	x-gtalk	Only for "ims"
type	home	TYPE	home	May be combined with other types in vCard
type	icq	TYPE	x-icq	Only for "ims"
type	mobile	TYPE	cell	May be combined with other types in vCard
type	msn	TYPE	x-msn	Only for "ims"
type	other			Omitted in vCard
type	pager	TYPE	pager	May be combined with other types in vCard
type	photo			Only for "photo", vCard parameter can be omitted.
type	qq	TYPE	x-qq	Only for "ims"

```
| type      | skype  | TYPE      | x-skype     | Only for "ims"     |
|           |        |           |             |                    |
| type      | work   | TYPE      | work        | May be combined    |
|           |        |           |             | with other types   |
|           |        |           |             | in vCard           |
|           |        |           |             |                    |
| type      | xmpp   | TYPE      | x-xmpp      | Only for "ims"     |
|           |        |           |             |                    |
| type      | yahoo  | TYPE      | x-yahoo     | Only for "ims"     |
|           |        |           |             |                    |
| type      | yahoo  | TYPE      | x-thumbnail | Only for          |
|           |        |           |             | "thumbnail"        |
+-----------+--------+-----------+------------+--------------------+
```

Table 2: Mapping of SCIM attributes to vCard parameters

4. Mapping from vCard properties to SCIM attributes

4.1. Mapping of vCard properties

Table 3 describes a mapping from vCard properties to SCIM attributes.
For the cardinalities, the same notation from Section 3 is used.

Notice that the attributes "uid" and "userName" are mandatory in a
SCIM representation, whereas they may not be available in the vCard.
It is left to the application to generate sensible values for these
fields.

vCard property	SCIM attribute	Cardinality in vCard/SCIM	Notes
ANNIVERSARY		v*1	
ADR (country)	addresses/country	v* S*	
ADR (extended address)		v*	
ADR (LABEL)	addresses/formatted	v* S*	
ADR (locality)	addresses/locality	v* S*	
ADR (post office box)	addresses/streetAddress	v* S*	
ADR (postal code)	addresses/postalCode	v* S*	
ADR (region)	addresses/region	v* S*	
ADR (street address)	addresses/streetAddress	v* S*	
BDAY		v*1	
BIRTHPLACE		v*1	Defined in [RFC6474].

CALADRURI		v*	Purpose: to specify the calendar user address to which a scheduling request should be sent for the object represented by the vCard.
CALURI		v*	Purpose: to specify the URI for a calendar associated with the object represented by the vCard.
CATEGORIES		v*	Contains not necessarily unified tags.
CLIENTPIDMAP		v*	Link between local PID and global URI.
DEATHDATE		v*1	Defined in [RFC6474].
DEATHPLACE		v*1	Defined in [RFC6474].
EMAIL	emails	v* S*	Can have TYPE="work", TYPE="home".
EXPERTISE		v*	Defined in [RFC6715].

FBURL		v*	Purpose: to specify the URI for the busy time associated with the object that the vCard represents.
FN	names/formatted	v1* S*1	
GENDER		v*1	Can have the values "M"ale, "F"emale, "O"ther, "N"one or not applicable or "U"nknown.
GEO		v*	GPS coordinates
HOBBY		v*	Defined in [RFC6715].
IMPP	ims	v* S*	
INTEREST		v*	Defined in [RFC6715].
KEY	x509Certificates?	v* S*	Care is required: keys may not have the same usage.

KIND		v*1	In vCard can have the values "individual" ,"group", "org" and "location". The value "application"was added by[RFC6473].
LANG	preferredLanguage	v* S*1	
LOGO		v*	
MEMBER	members/id	v* S*	Contains a vCard ID of a member of this group. The vCard MUST have KIND="group".ID must be converted.
N (additional names)	names/middleName	v*1 S*1	
N (family names)	names/familyName	v*1 S*1	
N (given names)	names/givenName	v*1 S*1	
N (honorific prefixes)	names/honorificPrefix	v*1 S*1	
N (honorific suffixes)	names/honorificSuffix	v*1 S*1	
NICKNAME	nickName	v* S*1	
NOTE		v*	Any text.
ORG	organization	v* S*1	
ORG-DIRECTORY		v*	Defined in [RFC6715].

PHOTO	photos	v* S*	URL of a web location where the photo can be retrieved.
PRODID		v*1	ID for producer of vCard.
RELATED		v*	Contains a vCard ID of another related vCard. Can have many TYPE values, such as "friend", "neighbor" and "spouse".
REV		v*1	Purpose: to specify revision information about the current vCard.
ROLE	roles	v* S*1	
SOUND		v*	
SOURCE		v*	Similar to SCIM meta/location.
TEL (TYPE="textphone")	phoneNumbers, type="other"	v* S*	See Table 4 for related type mapping.
TITLE	title	v* S*1	
TZ	timezone	v* S*1	

UID	externalId	v*1 S*1	See Section 5 for conversion from vCard UID space to SCIM id space.
URL	profileUrl	v* S*1	
VERSION		v1	Version of vCard specificatio n.
XML		v*	Purpose: to include extended XML-encoded vCard data in a plain vCard.

Table 3: vCard to SCIM mapping

4.2. Mapping of vCard parameters

Table 4 describes how vCard parameters are mapped to SCIM.

vCard parameter	vCard parameter value	SCIM representation	Notes
TYPE	cell	"type": "mobile"	
TYPE	fax	"type": "fax"	
TYPE	pager	"type": "pager"	
TYPE	text	"type": "other"	
TYPE	textphone	"type": "other"	
TYPE	video	"type": "video"	
TYPE	voice		Omitted in SCIM

Table 4: Mapping of vCard parameters

5. Mapping between SCIM and vCard IDs

   A SCIM specific prefix could be used to indicate the conversion from
   SCIM IDs to vCard UIDs. A "Service Provider" specific part would
   need to be included in the vCard UID, as the SCIM ID is unique within
   the Service Provider's space only. The following format is proposed:

                  UID:scim:[serviceProviderID]:123456789

   Conversion from vCard to SCIM may be done similarly, i.e. by adding a
   prefix to the vCard UID. The SCIM schema document mentions for the
   SCIM ID: "This identifier MUST be unique across the Service
   Provider's entire set of Resources", so as long as the vCard UID
   indeed is globally unique, and the service provider uses the prefix
   for vCard acquired resources only, the rule should hold.

   Notice that the above mechanism allows looping. For example,
   converting SCIM -> vCard -> SCIM would lead to another SCIM ID in the
   second representation as in the first. This indeed reflects the
   possible loss of information in the conversion process. It is
   RECOMMENDED to avoid this kind of chained conversion.

   Because of the format of the vCard UID after conversion from SCIM,
   the SCIM service provider can detect above mentioned chained
   conversion, as well as the original vCard ID. The actions the
   service provider may take upon such detection may for example include
   using the original SCIM data instead, or using smarter mapping by
   analysing the original and the new import. This kind of mechanisms
   is left out of scope of this document.

6. **Differences between vCard and SCIM**

   This section contains a non-exhaustive list of differences between
   vCard and SCIM.

   o In vCard, a group property can be established. This property
      contains the IDs of its members. In SCIM however, the group/
      membership relation can be signalled in two directions: just like
      vCard the group object can signal its members through the
      "members" attribute, but the member objects can also point to the
      groups they are part of, through the "groups" attribute.

   o In SCIM, relations between objects can be established either
      through their IDs or through their URIs. vCard only uses IDs to
      signal relationships between entities.

7. Examples

7.1. Mapping from SCIM to vCard

   Figure 2 contains the result after converting the SCIM data from
   Figure 1 to vCard.

   Notice that the following fields have been omitted during conversion:

   o userName

   o locale

   o active

   o password

   o groups

   o meta fields except for "lastModified"


```
{
 "schemas": ["urn:scim:schemas:core:2.0:User"],
 "id": "2819c223-7f76-453a-919d-413861904646",
 "externalId": "701984",
 "userName": "bjensen@example.com",
 "name": {
   "formatted": "Ms. Barbara J Jensen III",
   "familyName": "Jensen",
   "givenName": "Barbara",
   "middleName": "Jane",
   "honorificPrefix": "Ms.",
   "honorificSuffix": "III"
 },
 "displayName": "Babs Jensen",
 "nickName": "Babs",
 "profileUrl": "https://login.example.com/bjensen",
 "emails": [
   {
     "value": "bjensen@example.com",
     "type": "work",
     "primary": true
   },
   {
     "value": "babs@jensen.org",
     "type": "home"
   }
```

```
      ],
      "addresses": [
        {
          "type": "work",
          "streetAddress": "100 Universal City Plaza",
          "locality": "Hollywood",
          "region": "CA",
          "postalCode": "91608",
          "country": "USA",
          "formatted": "100 Universal City Plaza\nHollywood, CA 91608 USA",
          "primary": true
        },
        {
          "type": "home",
          "streetAddress": "456 Hollywood Blvd",
          "locality": "Hollywood",
          "region": "CA",
          "postalCode": "91608",
          "country": "USA",
          "formatted": "456 Hollywood Blvd\nHollywood, CA 91608 USA"
        }
      ],
      "phoneNumbers": [
        {
          "value": "555-555-5555",
          "type": "work"
        },
        {
          "value": "555-555-4444",
          "type": "mobile"
        }
      ],
      "ims": [
        {
          "value": "someaimhandle",
          "type": "aim"
        }
      ],
      "photos": [
        {
          "value": "https://photos.example.com/profilephoto/72930000000Ccne/F",
          "type": "photo"
        },
        {
          "value": "https://photos.example.com/profilephoto/72930000000Ccne/T",
          "type": "thumbnail"
        }
      ],
```

```
     "userType": "Employee",
     "title": "Tour Guide",
     "preferredLanguage":"en_US",
     "locale": "en_US",
     "timezone": "America/Los_Angeles",
     "active":true,
     "password":"t1meMa$heen",
     "groups": [
       {
         "value": "e9e30dba-f08f-4109-8486-d5c6a331660a",
         "$ref": "https://example.com/v1/Groups/e9e30dba-f08f-4109-8486-
d5c6a331660a",
         "display": "Tour Guides"
       },
       {
         "value": "fc348aa8-3835-40eb-a20b-c726e15c55b5",
         "$ref": "https://example.com/v1/Groups/fc348aa8-3835-40eb-a20b-
c726e15c55b5",
         "display": "Employees"
       },
       {
         "value": "71ddacd2-a8e7-49b8-a5db-ae50d0a5bfd7",
         "$ref": "https://example.com/v1/Groups/71ddacd2-a8e7-49b8-a5db-
ae50d0a5bfd7",
         "display": "US Employees"
       }
     ],
     "x509Certificates": [
       {
         "value":
         "MIIDQzCCAqygAwIBAgICEAAwDQYJKoZIhvcNAQEFBQAwTjELMAkGA1UEBhMCVVMx
          EzARBgNVBAgMCkNhbGlmb3JuaWExFDASBgNVBAoMC2V4YW1wbGUuY29tMRQwEgYD
          VQQDDAtleGFtcGxlLmNvbTAeFw0xMTEwMjIwNjI0MzFaFw0xMjEwMDQwNjI0MzFa
          MH8xCzAJBgNVBAYTAlVTMRMwEQYDVQQIDApDYWxpZm9ybmlhMRQwEgYDVQQKDAtl
          eGFtcGxlLmNvbTEhMB8GA1UEAwwYTXMuIEJhcmJhcmEgSiBKZW5zZW4gSUlJMSIw
          IAYJKoZIhvcNAQkBFhNiamVuc2VuQGV4YW1wbGUuY29tMIIBIjANBgkqhkiG9w0B
          AQEFAAOCAQ8AMIIBCgKCAQEA7Kr+Dcds/JQ5GwejJFcBIP682X3xpjis56AK02bc
          1FLgzdLI8auoR+cC9/Vrh5t66HkQIOdA4unHh0AaZ4xL5PhVbXIPMB5vAPKpzz5i
          PSi8xO8SL7I7SDhcBVJhqVqr3HgllEG6UClDdHO7nkLuwXq8HcISKkbT5WFTVfFZ
          zidPl8HZ7DhXkZIRtJwBweq4bvm3hM1Os7UQH05ZS6cVDgweKNwdLLrT51ikSQG3
          DYrl+ft781UQRIqxgwqCfXEuDiinPh0kkvIi5jivVu1Z9QiwlYEdRbLJ4zJQBmDr
          SGTMYn4lRc2HgHO4DqB/bnMVorHB0CC6AV1QoFK4GPe1LwIDAQABo3sweTAJBgNV
          HRMEAjAAMCwGCWCGSAGG+EIBDQQfFh1PcGVuU1NMIEdlbmVyYXRlZCCBDZXJ0aWZp
          Y2F0ZTAdBgNVHQ4EFgQU8pD0U0vsZIsaA16lL8En8bx0F/gwHwYDVR0jBBgwFoAU
          dGeKitcaF7gnzsNwDx708kqaVt0wDQYJKoZIhvcNAQEFBQADgYEAA81SsFnOdYJt
          Ng5Tcq+/ByEDrBgnusx0jloUhByPMEVkoMZ3J7j1ZgI8rAbOkNngX8+pKfTiDz1R
          C4+dx8oU6Za+4NJXUjlL5CvV6BEYb1+QAEJwitTVvxB/A67g42/vzgAtoRUeDov1
          +GFiBZ+GNF/cAYKcMtGcrs2i97ZkJMo="
```

```
        }
    ],
    "meta": {
```

```
      "resourceType": "User",
      "created": "2010-01-23T04:56:22Z",
      "lastModified": "2011-05-13T04:42:34Z",
      "version": "W\/\"a330bc54f0671c9\"",
      "location": "https://example.com/v1/Users/
2819c223-7f76-453a-919d-413861904646"
    }
  }
```

Figure 1: Original SCIM data

```
BEGIN:VCARD
VERSION:4.0
UID:"scim:provider.example:org:2819c223-7f76-453a-919d-413861904646"
FN:Ms. Barbara J Jensen III
N:Jensen;Barbera;Jane;Ms.;III
NICKNAME:Babs
URL:"https://login.example.com/bjensen"
EMAIL;TYPE=work;PREF=1:bjensen@example.com
EMAIL;TYPE=home:babs@jensen.org
ADR;LABEL="100 Universal City Plaza\nHollywood, CA 91608 USA";TYPE=work
 :;;100 Universal City Plaza;Hollywood;CA;91608;USA
ADR;LABEL="456 Hollywood Blvd\nHollywood, CA 91608 USA";type=home:;;456
 Hollywood Blvd;Hollywood;CA;91608;USA
TEL;TYPE=voice,work:555-555-5555
TEL;TYPE=cell:555-555-4444
IMPP;TYPE=x-aim:someaimhandle
PHOTO:"https://photos.example.com/profilephoto/72930000000Ccne/F"
PHOTO;TYPE=x-thumbnail:"https://photos.example.com/profilephoto/7293000
 0000Ccne/T"
ROLE:Employee
TITLE:Tour Guide
LANG:en-US
TZ:America/Los_Angeles
KEY:...MIIDQzCCAqygAwIBAgICEAAwDQYJKoZIhvcNAQEFBQAwTjELMAkGA1UEBhMCVVMx
 EzARBgNVBAgMCkNhbGlmb3JuaWExFDASBgNVBAoMC2V4YW1wbGUuY29tMRQwEgYD
 VQQDDAtleGFtcGxlLmNvbTAeFw0xMTEwMjIwNjI0MzFaFw0xMjEwMDQwNjI0MzFa
 MH8xCzAJBgNVBAYTAlVTMRMwEQYDVQQIDApDYWxpZm9ybmlhMRQwEgYDVQQKDAtl
 eGFtcGxlLmNvbTEhMB8GA1UEAwwYTXMuIEJhcmJhcmEgSiBKZW5zZW4gSUlJMSIw
 IAYJKoZIhvcNAQkBFhNiamVuc2VuQGV4YW1wbGUuY29tMIIBIjANBgkqhkiG9w0B
 AQEFAAOCAQ8AMIIBCgKCAQEA7Kr+Dcds/JQ5GwejJFcBIP682X3xpjis56AK02bc
 1FLgzdLI8auoR+cC9/Vrh5t66HkQIOdA4unHh0AaZ4xL5PhVbXIPMB5vAPKpzz5i
 PSi8xO8SL7I7SDhcBVJhqVqr3HgllEG6UClDdHO7nkLuwXq8HcISKkbT5WFTVfFZ
 zidPl8HZ7DhXkZIRtJwBweq4bvm3hM1Os7UQH05ZS6cVDgweKNwdLLrT51ikSQG3
 DYrl+ft781UQRIqxgwqCfXEuDiinPh0kkvIi5jivVu1Z9QiwlYEdRbLJ4zJQBmDr
 SGTMYn4lRc2HgHO4DqB/bnMVorHB0CC6AV1QoFK4GPe1LwIDAQABo3sweTAJBgNV
 MIIDQzCCAqygAwIBAgICEAAwDQYJKoZIhvcNAQEFBQAwTjELMAkGA1UEBhMCVVMx
```

EzARBgNVBAgMCkNhbGlmb3JuaWExFDASBgNVBAoMC2V4YW1wbGUuY29tMRQwEgYD

        VQQDDAtleGFtcGxlLmNvbTAeFw0xMTEwMjIwNjI0MzFaFw0xMjEwMDQwNjI0MzFa
        MH8xCzAJBgNVBAYTAlVTMRMwEQYDVQQIDApDYWxpZm9ybmlhMRQwEgYDVQQKDAtl
        eGFtcGxlLmNvbTEhMB8GA1UEAwwYTXMuIEJhcmJhcmEgSiBKZW5zZW4gSUlJMSIw
        IAYJKoZIhvcNAQkBFhNiamVuc2VuQGV4YW1wbGUuY29tMIIBIjANBgkqhkiG9w0B
        AQEFAAOCAQ8AMIIBCgKCAQEA7Kr+Dcds/JQ5GwejJFcBIP682X3xpjis56AK02bc
        1FLgzdLI8auoR+cC9/Vrh5t66HkQIOdA4unHh0AaZ4xL5PhVbXIPMB5vAPKpzz5i
        PSi8xO8SL7I7SDhcBVJhqVqr3HgllEG6UClDdHO7nkLuwXq8HcISKkbT5WFTVfFZ
        zidPl8HZ7DhXkZIRtJwBweq4bvm3hM1Os7UQH05ZS6cVDgweKNwdLLrT51ikSQG3
        DYrl+ft781UQRIqxgwqCfXEuDiinPh0kkvIi5jivVu1Z9QiwlYEdRbLJ4zJQBmDr
        SGTMYn4lRc2HgHO4DqB/bnMVorHB0CC6AV1QoFK4GPe1LwIDAQABo3sweTAJBgNV
        HRMEAjAAMCwGCWCGSAGG+EIBDQQfFh1PcGVuU1NMIEdlbmVyYXRlZCBDZXJ0aWZp
        Y2F0ZTAdBgNVHQ4EFgQU8pD0U0vsZIsaA16lL8En8bx0F/gwHwYDVR0jBBgwFoAU
        dGeKitcaF7gnzsNwDx708kqaVt0wDQYJKoZIhvcNAQEFBQADgYEAA81SsFnOdYJt
        Ng5Tcq+/ByEDrBgnusx0jloUhByPMEVkoMZ3J7j1ZgI8rAbOkNngX8+pKfTiDz1R
        C4+dx8oU6Za+4NJXUjlL5CvV6BEYb1+QAEJwitTVvxB/A67g42/vzgAtoRUeDov1
        +GFiBZ+GNF/cAYKcMtGcrs2i97ZkJMo=
        REF:"2011-05-13T04:42:34Z"
        END:VCARD

                    Figure 2: After conversion to vCard

7.2. Mapping from vCard to SCIM

    Figure 4 contains the result after converting the vCard data from
    Figure 3 to SCIM.

    The following vCard attributes have been omitted in the SCIM
    representation:

    o GENDER

    o BDAY

    The mandatory "uid" and "userName" attributes have been added to the
    SCIM representation, although they have not been defined in the
    vCard.

```
BEGIN:VCARD
VERSION:4.0
FN:Vincent van Gogh
N:van Gogh;Vincent;;;
GENDER:M
BDAY:18530330
ROLE;LANGUAGE="en":painter
LANG;PREF=1:nl
LANG;PREF=2:fr
ADR;LABEL="Vincent van Gogh\n54 Rue Lepic\n75018 Paris\nFrance";LANGUAG
 E="fr";TYPE=home:;3th floor;54 Rue Lepic;Paris;;75018;France
TEL;TYPE="work,voice";PREF=1:+33-1-123456
TEL;TYPE="home,voice";PREF=2:+33-1-654321
EMAIL;TYPE=home:vangogh@example.com
URL;TYPE=work:"http://www.vangogh.example.com"
TZ:+0100
END:VCARD
```

                        Figure 3: Original SCIM data

```
   {
     "schemas": ["urn:scim:schemas:core:2.0:User"],
     "id": "xyz",
     "userName": "vangogh@example.com",
     "name": {
       "formatted": "Vincent van Gogh",
       "familyName": "van Gogh",
       "givenName": "Vincent",
     },
     "roles": [
       {
         "value": "painter"
       }
     ],
     "preferredLanguage": "nl",
     "adresses": [
       {
         "type": "home",
         "streetAddress": "54 Rue Lepic",
         "locality": "Paris",
         "postalCode": "75018",
         "country": "France",
         "formatted": "Vincent van Gogh\n54 Rue Lepic\n75018 Paris\nFrance"
       }
     ],
     "phoneNumbers": [
       {
         "value": "+33-1-123456",
         "type": "work"
       },
       {
         "value": "+33-1-654321",
         "type": "home"
       }
     ],
     "emails": [
       {
         "value": "vangogh@example.com",
         "type": "home"
       }
     ],
     "timezone": "+0100"
   }
```

                      Figure 4: Original SCIM data

8. Open issues

    The following issues require further consideration:

    o It may be feasible to leave out the conversion between SCIM ids
       and vCard UIDs, as they may be dependent on the particular
       application that is importing the information.

    o It is unclear on whether the SCIM ID can include alphanumeric
       characters or is restricted to numeric characters only. The
       examples in [I-D.ietf-scim-core-schema] seem to indicate that they
       consist of hexadecimal numbers, with dashes at appropriate places.
       If this is the case, then during the conversion from vCard UIDs to
       SCIM IDs would include conversion of alphanumeric characters to
       hexadecimal values.

    o For SCIM fields that have no equivalent vCard attributes, vCard
       attributes of the form "x-..." could be defined. Alternatively,
       vCard attributes could be defined, and registered with IANA.

    o The "id" and "userName" fields are mandatory in SCIM. However, a
       vCard does not have to contain similar information. Creating a
       sensible value of these fields may be left to the SCIM application
       that is importing the vCard, or guidelines could be defined.

9. IANA Considerations

   A "manager" TYPE for the RELATED vCard property may need
   registration.

10. Security Considerations

   The mapping between vCard and SCIM may be useful for easily
   transferring data for one system towards another. However, it also
   has privacy implications. Therefore, it is important that user
   consensus is acquired where applicable.

   For this document, some decisions were made concerning mapping
   between attributes and properties with similar, but not equal,
   semantics. This was done in a best effort manner. However one
   should realise that during the mapping process some accuracy from the
   original data may be lost.

   Conversion from SCIM to vCard and subsequently back to SCIM, as well
   as conversion from vCard to SCIM and subsequently back to vCard
   SHOULD be avoided.

11. Acknowledgements

12. References

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