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## vCard KIND:device

### Abstract

This document defines a value of "device" for the vCard KIND property so that the vCard format can be used to represent computing devices such as appliances, computers, or network elements (e.g., a server, router, switch, printer, sensor, or phone).

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## 1. Introduction

Version 4 of the vCard specification [RFC6350] defines a new "KIND" property to specify the type of entity that a vCard represents. During its work on the base vCard4 specification, the VCARDDAV Working Group defined values of "individual", "org", "group", and "location" for the KIND property.

During working group discussion of the document that became [RFC6473], consideration was given to defining a more general value of "thing", but it was decided to split "thing" into software applications and hardware devices and to define only the "application" value at that time. Since then, use cases for device vCards have emerged. These use cases involve using vCards as a primer for inventory and asset tracking data specific to network elements. Therefore, this document complements [RFC6473] by defining a value of "device" for the KIND property to represent computing devices such as appliances, computers, or network elements. In this context, the concept of a device is constrained to computing devices and thus is distinct from purely mechanical devices such as elevators, electric generators, etc., that cannot communicate in any way over a network. This does not preclude, however, network-attached sensors that are connected to such mechanical devices.

## 2. Scope

When the KIND property has a value of "device", the vCard represents a computing device such as an appliance, a computer, or a network element (e.g., a server, router, switch, printer, sensor, or phone). More formally, a "device" is functionally equivalent to the "device" object class used in the Lightweight Directory Access Protocol [RFC4519] as derived from the Open Systems Interconnection model [X.521] [X.200]. However, whereas [X.521] specifies that devices are "physical" elements, a device in this context can also be virtual such as a virtual machine running within another physical element. As one example of the "device" KIND, vCards can be embedded into devices at manufacturing time so that basic information such as

serial number, support email, and documentation URL can be retrieved upon initial deployment. This vCard can be modified after the device is deployed to contain user-specified data about the device's characteristics. The vCard data can therefore be used for both asset tracking and operational purposes.

A device might have a number of embedded vCards for varying purposes. The process for discovering and accessing these vCards is purposefully left unspecified in this document, as this process could rely on any mechanism that makes sense for the device in question. For example, a device could have one or more of the following vCard instances:

- o The device itself. For example, the FN ("full name") property might represent the hostname of a computing device; the URL property might represent a website that contains details on where to find documentation or get further information about the device; the KEY property might represent a digital certificate that was provisioned into the device at the time of manufacture [IEEE.802.1AR], or a public key certificate previously provisioned into the device; and the ADR, GEO, and TZ properties might represent the physical address, geographical location, and time zone where the device is deployed.
- o An organization or person that produces or manufactures the device.
- o A person or role that maintains or administers the device.
- o Application-level vCards as described in [RFC6473] for each application installed on the device.

When a device has vCards other than its KIND:device vCard, those vCards can be linked together with RELATED (see the definition of the RELATED organizational property in Section 6.6.6 of [RFC6350]). In multi-vCard instances, the KIND:device vCard would use the RELATED property to express the relationship with the ancillary vCard(s). Those supplementary vCards need not use RELATED to point back to the KIND:device vCard. In this manner, the vCard for the device itself can be easily distinguished from vCards referring to the vendor organization, device administrator, and installed applications.

The following base properties make sense for vCards that represent devices (this list is not exhaustive, and other properties might be applicable as well):

- \* ADR
- \* EMAIL
- \* FN
- \* GEO
- \* IMPP
- \* KEY
- \* KIND
- \* LANG
- \* LOGO
- \* NOTE
- \* ORG
- \* PHOTO
- \* RELATED
- \* REV
- \* SOURCE
- \* TEL
- \* TZ
- \* UID
- \* URL

Although it might be desirable to define a more fine-grained taxonomy of devices (e.g., a KIND of "device" with a subtype of "router" or "computer"), such a taxonomy is out of scope for this document.

### 3. Example

The following is an example of a router device that contains both manufacturing details as well as post-deployment attributes and uses the XML representation of vCard (xCard) described in [RFC6351]. This vCard points to another, related vCard that contains the details of an administrative contact for the device. This vCard also leverages the extensibility of the xCard format to reference additional namespaces in order to provide richer details about the given device (e.g., the serial number and software version are specified as xCard extensions).

```
<vcard xmlns="urn:ietf:params:xml:ns:vcard-4.0">
  <kind><text>device</text></kind>
  <fn>
    <parameters>
      <type><text>x-model-name</text></type>
    </parameters>
    <text>RTR1001</text>
  </fn>
  <fn><text>core-rtr-1.example.net</text></fn>
  <url><uri>http://www.example.com/support/index.html</uri></url>
  <email><text>support@example.com</text></email>
  <email>
    <parameters>
      <type><text>x-local-support</text></type>
    </parameters>
    <text>network-support@example.net</text>
  </email>
  <impp><uri>xmpp:core-rtr-1@example.net</uri></impp>
  <related>
    <parameters>
      <type><text>contact</text></type>
    </parameters>
    <uri>urn:uuid:5CEF1870-0326-11E2-A21F-0800200C9A66</uri>
  </related>
  <logo><uri>http://www.example.com/images/logo.png</uri></logo>
  <geo><uri>geo:35.82,-78.64</uri></geo>
  <tz><text>America/New_York</text></tz>
  <rev><timestamp>20120104T213000Z</timestamp></rev>
  <uid><uri>urn:uuid:00CCFB88-155F-40F6-B9D9-B04D134860C0</uri></uid>
  <serial-number xmlns='http://example.org/profiles/serial-number'>
    FTX1234ABCD
  </serial-number>
  <note>
    <parameters>
      <type><text>x-contract-number</text></type>
    </parameters>
    <text>1234567</text>
  </note>
  <mac xmlns='http://example.org/profiles/mac'>
    00-00-5E-00-00-01
  </mac>
  <sw-version xmlns='http://example.org/profiles/sw-version'>
    2.1.5
  </sw-version>
</vcard>
```

#### 4. IANA Considerations

IANA has added the following entry to the "vCard Property Values" table of the "vCard Elements" registry (<http://www.iana.org/assignments/vcard-elements>):

Property	Value	Reference
KIND	device	<a href="#">RFC 6869, Section 3</a>

Table 1: IANA Registration of KIND:device vCard Property Value

In conformance with [Section 10.2.6 of \[RFC6350\]](#), the registration template is as follows:

Value: device

Purpose: The entity represented by the vCard is a computing device such as an appliance, computer, or network element.

Conformance: This value can be used with the "KIND" property.

Example: See [Section 3 of RFC 6869](#).

#### 5. Security Considerations

Registration of this vCard KIND to represent devices does not in itself introduce security considerations beyond those specified for vCards in general as described in [\[RFC6350\]](#). Nevertheless, risks can arise for vulnerable Internet-connected devices as a result of the publication of the identification details provided by device vCards. Well-known publicly accessible device vCard repositories, while not defined in this document, can increase the probability of an exploitation of an existing vulnerability, especially for devices with no good way to update their software or firmware. It is the responsibility of the device administrator to adhere to best current security practices and employ proper strategies for software upgrades and security patches in order to mitigate vulnerability to attack. Specifications defining device-specific vCard extensions or profiles that might be included in such vCards also need to consider this potential increased risk.

## 6. References

### 6.1. Normative References

- [RFC6350] Perreault, S., "vCard Format Specification", [RFC 6350](#), August 2011.

### 6.2. Informative References

- [IEEE.802.1AR] Institute of Electrical and Electronics Engineers, "Secure Device Identity", IEEE 802.1AR, 2009.
- [RFC4519] Sciberras, A., "Lightweight Directory Access Protocol (LDAP): Schema for User Applications", [RFC 4519](#), June 2006.
- [RFC6351] Perreault, S., "xCard: vCard XML Representation", [RFC 6351](#), August 2011.
- [RFC6473] Saint-Andre, P., "vCard KIND:application", [RFC 6473](#), December 2011.
- [X.200] International Telecommunication Union, "Information Technology - Open Systems Interconnection - Basic Reference Model: The Basic Model", ITU-T Recommendation X.521, ISO Standard 9594-7, February 2001.
- [X.521] International Telecommunication Union, "Information Technology - Open Systems Interconnection - The Directory: Selected Object Classes", ITU-T Recommendation X.200, ISO Standard 7498-1, July 1994.

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