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Schema for representing resources for calendaring and scheduling
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Abstract

This specification describes a schema for representing resources for calendaring and scheduling. A resource in the scheduling context is any shared entity that can be scheduled by a calendar user, but does not control its own attendance status.

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1. Introduction

This specification defines a schema for representing resources to ease the discovery and scheduling of resources between any calendar client and server.

LDAP and vCard mappings of the schema are described in this document. The Object model chosen is the lowest common denominator to adapt for LDAP.

2. Conventions Used in This Document

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. General Considerations

Data values must have valid representation for the chosen format with respect to escape characters, line folding, and so on.

4. Resource Object

A resource object definition should contain all information required to find and schedule the right resource. For this, it should contain all, or a set of the attributes described in Section 5. The cn attribute, described in Section 5.1 MUST be present in any resource object. Additional proprietary attributes may be defined as well, but must begin with "X-". Clients encountering attributes they don't know about must ignore them.

Attributes or Properties required to contact the resource are not included in this specification. LDAP attributes defined in [RFC4519] and VCARD properties defined in vCard Format Specification [RFC6350] can be used to include contact information for the resource.

4.1. LDAP Resource ObjectClass Definition

In LDAP, a resource object SHOULD be defined as an objectclass with attributes as defined in Section 5. This objectClass MUST be an auxiliary class. Its Superior class is the calEntry objectClass as defined in Section 2.4.3.1 of [RFC2739].

Definition of the CalendarResource ObjectClass:

```
( 1.3.6.1.1.x.1.1
  NAME 'CalendarResource'
  DESC 'Calendar Resource Object Class'
  SUP calEntry
  AUXILIARY
  MUST (cn)
  MAY (kind $ nickname $ description $ ou $ categories $
        member $ uniquemember $ accessibilityurl $ capacity $
        owner $ resourcemanager $ timezoneid $
        multiplebookings $ maxinstances $
        bookingwindowstart $ bookingwindowend $
        vcarduid $ related) )
```

5. Resource Attributes

5.1. Common Name

Description:

Full name of the resource. This attribute MUST be defined for a resource object.

ValueType:

String value.

Example value:

Room One

5.1.1. LDAP Attribute Definition

cn attribute as defined in Section 2.3 of [RFC4519]. This attribute MUST be present in a CalendarResource object.

5.1.2. VCard Property Definition

FN property as defined in Section 6.2.1 of [RFC6350].

5.2. Kind

Description:

The kind of object represented.

ValueType:

Some of the possible values are "Location", "Individual", "CalendarResource", or "Group".
Location is used for any physical location resource such as room, building, etc.
Individual is used for for a human resource such as driver, technician, etc.

CalendarResource is used for any physical object that can scheduled like projector, printer, etc.

Group is used to specify a group of resources with a specific skill set. For example: drivers, electricians, etc.

Example value:
Location

5.2.1. LDAP Definition

In LDAP, this information can be represented by including the right category objectclass.

Possible objectclasses are:

Person objectclass as defined in Section 3.12 of [RFC4519].

groupOfNames objectclass as defined in Section 3.5 of [RFC4519].

groupOfUniqueNames objectclass as defined in Section 3.6 of [RFC4519].

device objectclass as defined in Section 3.4 of [RFC4519].

room objectclass as defined in Section 3.8 of [RFC4524].

In the absence of an objectclass that accurately describes the type of the object, the KIND attribute defined below MUST be used.

5.2.1.1. LDAP Attribute Definition

Definition of the kind LDAP attribute:

```
( 1.3.6.1.1.x.0.1
  NAME 'Kind'
  DESC 'Kind of Object'
  EQUALITY caseIgnoreMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15
  SINGLE-VALUE )
```

5.2.2. VCard Property Definition

Property KIND that specifies the kind of object represented, as defined in Section 6.1.4 of [RFC6350]. A new value of "calendarresource" will be used to represent any physical object or device.

5.2.3. Mapping of KIND value between LDAP and VCard representations

KIND Value Mapping Table:

LDAP Objectclass	VCard Value
person	individual
groupOfNames or groupOfUniqueNames	group
device	calendarresource
room	location

5.3. Unique ID

Description:

A Unique Identifier.

ValueType:

Single string value.

Example value:

room1-id1

5.3.1. LDAP Attribute Definition

Definition of the vcarduid LDAP attribute:

```
( 1.3.6.1.1.x.0.1
  NAME 'VcardUid'
  DESC 'VCard UniqueID'
  EQUALITY caseExactMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15
  SINGLE-VALUE )
```

5.3.2. VCard Property Definition

UID property as defined in Section 6.7.6 of [RFC6350].

5.4. Nick Name

Description:

A short or popular name for the resource.

ValueType:

String value.

Example value:
TheOne

5.4.1. LDAP Attribute Definition

Definition of the nickname LDAP attribute:

```
( 1.3.6.1.1.x.0.2
  NAME 'NickName'
  DESC 'Nick Name'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.4.2. VCard Property Definition

NICKNAME property as defined in Section 6.2.3 of [RFC6350].

5.5. Description

Description:
Description of the resource.

ValueType:
String value.

Example value:
Room 1 in Building X

5.5.1. LDAP Attribute Definition

description attribute as defined in Section 2.5 of [RFC4519].

5.5.2. VCard Property Definition

NOTE property as defined in Section 6.7.2 of [RFC6350].

5.6. Organizational Unit

Description:
Organizations the resource belongs to.

ValueType:
String value.

Example value:
EngineeringDepartment

5.6.1. LDAP Attribute Definition

ou attribute as defined in Section 2.20 of [RFC4519].

5.6.2. VCard Property Definition

ORG property as defined in Section 6.6.4 of [RFC6350].

5.7. Categories

Description:

Categories the resource falls under or tags for easy discovery of the resource.

ValueType:

String value. Multi-valued attribute with one attribute per text value in LDAP. One or more text values separated by a COMMA character in VCard property value.

Example value:

Rooms

5.7.1. LDAP Attribute Definition

Definition of the categories LDAP attribute:

```
( 1.3.6.1.1.x.0.3
  NAME 'Categories'
  DESC 'Categories'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.7.2. VCard Property Definition

CATEGORIES property as defined in Section 6.7.1 of [RFC6350].

5.8. Group Member

Description:

List of unique resources in a group of resources object.

ValueType:

URL value.

Example value:

<http://www.example.com/printer1.html>
<http://www.example.com/printer2.html>

5.8.1. LDAP Attribute Definition

member attribute as defined in Section 2.17 or uniquemember attribute as defined in Section 2.40 of [RFC4519].

5.8.2. VCard Property Definition

MEMBER property as defined in Section 6.6.5 of [RFC6350].

5.9. Admittance Info

Description:

Information required to gain access to the resource.

ValueType:

Object value.

5.9.1. LDAP ObjectClass Definition

Definition of the admittanceinfo LDAP objectclass:

```
( 1.3.6.1.1.x.1.2
  NAME 'AdmittanceInfo'
  DESC 'Calendar Resource Admittance Info Class'
  SUP CalendarResource
  AUXILIARY
  MAY (admittanceurl $ restricted) )
```

5.9.2. Restricted Access

Description:

Is access to the resource restricted?

ValueType:

Boolean value.

Example value:

TRUE

5.9.2.1. LDAP Attribute Definition

Definition of the restricted LDAP attribute:

```
( 1.3.6.1.1.x.0.4
  NAME 'Restricted'
  DESC 'Access Restricted'
  EQUALITY booleanMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.7
```

SINGLE-VALUE)

5.9.2.2. VCard Property Definition

Purpose: To specify if access is restricted or not.

Type value: A single boolean value.

Cardinality: (0,1)

ABNF:

RESTRICTEDACCESS-param = ; no parameter allowed
RESTRICTEDACCESS-value = boolean

Example:

RESTRICTEDACCESS:TRUE

5.9.3. Admittance Info URL

Description:

URL pointing to complete information for accessing the resource including getting accessibility rights, special entrances, and so on.

ValueType:

URL value.

Example value:

http://www.example.com/room1_admittance.html

5.9.3.1. LDAP Attribute Definition

Definition of the admittanceurl LDAP attribute:

```
( 1.3.6.1.1.x.0.5
  NAME 'AdmittanceURL'
  DESC 'Cal Resource Admittance Info URL'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.9.3.2. VCard Property Definition

Purpose: To specify URL pointing to Admission Information.

Type value: URI.

Cardinality: (0,n)

ABNF:

```
ADMISSIONINFO-param = "VALUE=uri" / any-param
ADMISSIONINFO-value = uri
```

Example:

```
ADMISSIONINFO:http://www.example.com/room1_admittance.html
```

5.10. Accessibility

Description:

Special resource accessibility info for the physically disabled.

ValueType:

URL value.

Example value:

```
http://www.example.com/room1_specialaccess.html
```

5.10.1. LDAP Attribute Definition

Definition of the accessibilityurl LDAP attribute:

```
( 1.3.6.1.1.x.0.6
  NAME 'accessibilityURL'
  DESC 'Cal Resource accessibility Info URL'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.10.2. VCard Property Definition

Purpose: To specify URL pointing to Disabled Access Information.

Type value: URI.

Cardinality: (0,n)

ABNF:

```
ACCESSIBILITYINFO-param = "VALUE=uri" / any-param
ACCESSIBILITYINFO-value = uri
```

Example:

```
ACCESSIBILITYINFO:http://www.example.com/room1_specialaccess.html
```

5.11. Capacity

Description:

Capacity of the resource.

ValueType:

Integer.

Example value:

10

5.11.1. LDAP Attribute Definition

Definition of the capacity LDAP attribute:

```
( 1.3.6.1.1.x.0.7
  NAME 'Capacity'
  DESC 'Cal Resource Capacity'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.27 )
```

5.11.2. VCard Property Definition

Purpose: To specify Capacity Information.

Type value: integer.

Cardinality: (0,n)

ABNF:

```
CAPACITY-param = "VALUE=integer" / any-param
CAPACITY-value = integer
```

Example:

CAPACITY:10

5.12. Inventory Info

Description:

Information on resources available as part of this resource.

ValueType:

Object value.

5.12.1. LDAP ObjectClass Definition

Definition of the inventoryinfo LDAP attribute:

```
( 1.3.6.1.1.x.1.3
  NAME 'InventoryInfo'
  DESC 'Calendar Resource Inventory Info Class'
  SUP CalendarResource
  AUXILIARY
  MAY (inventorylist $ inventoryurl) )
```

5.12.2. Inventory List

Description:

List of resources available as part of this resource.

ValueType:

String value. Multi-valued attribute with one attribute per text value in LDAP. One or more text values separated by a COMMA character in VCard property value.

Example value:

Printer

5.12.2.1. LDAP Attribute Definition

Definition of the inventorylist LDAP attribute:

```
( 1.3.6.1.1.x.0.8
  NAME 'InventoryList'
  DESC 'Inventory List'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.12.2.2. VCard Property Definition

Purpose: List the resources available as part of this resource.

Type value: One or more text values separated by a COMMA character (ASCII decimal 44).

Cardinality: (0,n)

ABNF:

```
INVENTORYLIST-param = "VALUE=text" / any-param
INVENTORYLIST-value = text
```

Example:
INVENTORYLIST:projector, phone

5.12.3. Inventory URL

Description:
A URL pointing to other resource URLs part of this resource.

ValueType:
URL value.

Example value:
http://www.example.com/room1_inventory.html

5.12.3.1. LDAP Attribute Definition

Definition of the inventoryurl LDAP attribute:

```
( 1.3.6.1.1.x.0.9
  NAME 'InventoryURL'
  DESC 'Cal Resource Inventory Info URL'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.12.3.2. VCard Property Definition

Purpose: To specify URL pointing to Inventory Information.

Type value: URI.

Cardinality: (0,n)

ABNF:
INVENTORYURL-param = "VALUE=uri" / any-param
INVENTORYURL-value = uri

Example:
INVENTORYURL:http://www.example.com/room1_inventory.html

5.13. Owner

Description:
Pointer to the owners of the resource. An owner is anyone who has complete authority over the resource, from naming to overall availability.

ValueType:
URL value.

Example value:
http://www.example.com/rooml_ownerinfo.html

5.13.1. LDAP Attribute Definition

owner attribute as defined in Section 2.21 of [RFC4519].

5.13.2. VCard Property Definition

Purpose: To specify URL pointing to Resource Owner. It MAY refer to something other than a vCard object.

Type value: URI.

Cardinality: (0,n)

ABNF:
RESOURCEOWNER-param = "VALUE=uri" / any-param
RESOURCEOWNER-value = uri

Example:
RESOURCEOWNER:http://www.example.com/rooml_owner.vcf

5.14. Resource Manager

Description:
Pointer to the managers of the resource. A manager is someone responsible for the day-to-day up keep of the resource.

ValueType:
URL value.

Example value:
http://www.example.com/rooml_managerinfo.html

5.14.1. LDAP Attribute Definition

Definition of the resourcemanager LDAP attribute:

```
( 1.3.6.1.1.x.0.10
  NAME 'ResourceManager'
  DESC 'Cal Resource Manager Info'
  EQUALITY distinguishedNameMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.12 )
```

5.14.2. VCard Property Definition

Purpose: To specify URL pointing to Resource Manager.

Type value: URI.

Cardinality: (0,n)

ABNF:

```
RESOURCEMANAGER-param = "VALUE=uri" / any-param  
RESOURCEMANAGER-value = uri
```

Example:

```
RESOURCEMANAGER:http://www.example.com/room1_manager.vcf
```

5.15. Calendar URL

Description:

URL to access calendar data of the resource.

ValueType:

URL value.

Example value:

```
http://www.example.com/calendar/home/Room1/calendar/
```

5.15.1. LDAP Attribute Definition

Calendar access attribute calCAPURI as defined in Section 2.4.4.3 and calOtherCAPURIs as defined in Section 2.4.4.7 of [RFC2739] respectively.

5.15.2. VCard Property Definition

Calendar access property CAPURI as defined in Section 2.3.3 of [RFC2739].

5.16. FreeBusy URL

Description:

URL to read freebusy information of the resource's calendar.

ValueType:

URL value.

Example value:

<http://www.example.com/freebusy/home/Room1/>

5.16.1. LDAP Attribute Definition

Calendar access attribute `calFBURL` as defined in Section 2.4.4.2 and `calOtherFBURLs` as defined in Section 2.4.4.6 of [RFC2739] respectively.

5.16.2. VCard Property Definition

`FBURL` attribute as defined in Section 2.3.1 of [RFC2739] and further explained in Section 6.9.1 of [RFC6350].

5.17. Scheduling Address

Description:

Address used for scheduling the resource by a Calendaring and Scheduling service.

ValueType:

String value.

Example value:

<mailto:room1@example.com>

5.17.1. LDAP Attribute Definition

Scheduling Address attribute `calCalAdrURI` as defined in Section 2.4.4.4 and `calOtherCalAdrURIs` as defined in Section 2.4.4.8 of [RFC2739] respectively. This is the address that would be used by a Scheduling and Calendaring application to schedule the resource. Its value must be a uri string, in most cases a `mailto: uri`. The mail attribute value of the resource should be used for scheduling, in the absence of this attribute.

5.17.2. VCard Property Definition

Scheduling Address property `CALADRURI` as defined in Section 2.3.2 [RFC2739] and further explained in Section 6.9.2 of [RFC6350]. This is the address that would be used by a Scheduling and Calendaring application to schedule the resource. Its value must be a uri string, in most cases a `mailto: uri`. The `EMAIL` property value of the resource should be used for scheduling, in the absence of this attribute.

5.18. Time Zone

Description:

TimeZone Identifier for the timezone the resource is in.

ValueType:

String value.

Example value:

America/New_York

5.18.1. LDAP Attribute Definition

Definition of the timezoneid LDAP attribute:

```
( 1.3.6.1.1.x.0.11
  NAME 'TimeZoneID'
  DESC 'Cal Time Zone ID'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.18.2. VCard Property Definition

TimeZone property TZ as defined in Section 6.5.1 of [RFC6350].

5.19. Multiple Bookings

Description:

Number of simultaneous bookings allowed.

ValueType:

Integer value.

Value of 0 indicates no limits.

Example value:

1

5.19.1. LDAP Attribute Definition

Definition of the multiplebookings LDAP attribute:

```
( 1.3.6.1.1.x.0.12
  NAME 'Multiplebookings'
  DESC 'Cal Num Bookings Allowed'
  EQUALITY integerMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.27
  SINGLE-VALUE )
```

5.19.2. VCard Property Definition

Purpose: To specify number of simultaneous bookings allowed.

Type value: integer.

Cardinality: (0,1)

ABNF:

```
MULTIBOOK-param = "VALUE=integer" / any-param  
MULTIBOOK-value = integer
```

Example:

```
MULTIBOOK:10
```

5.20. Maximum Instances

Description:

Maximum number of instances of an event, the resource can be scheduled for from NOW.

ValueType:

Integer value.

Value of 0 indicates no limits.

Example value:

```
60
```

5.20.1. LDAP Attribute Definition

Definition of the maxinstances LDAP attribute:

```
( 1.3.6.1.1.x.0.13  
  NAME 'MaxInstances'  
  DESC 'Cal Maximum Instances allowed'  
  EQUALITY integerMatch  
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.27  
  SINGLE-VALUE )
```

5.20.2. VCard Property Definition

Purpose: To specify maximum number of instances of an event, the resource can be scheduled for from NOW.

Type value: integer.

Cardinality: (0,1)

ABNF:

```
MAXINSTANCES-param = "VALUE=integer" / any-param
MAXINSTANCES-value = integer
```

Example:

```
MAXINSTANCES:10
```

5.21. BookingWindow Start

Description:

Defines how much time in advance the resource can be booked. The value of this property is used to calculate the earliest date and time when a resource can be reserved for an event starting on a specific date and time.

If this property value is defined, the resource may be booked for an event at a certain time, only if the current time is equal to or after the date and time calculated by subtracting this value from the event's proposed start time. If this property is absent, then the resource may be booked at any time before the end of the booking window.

ValueType: Duration value.

The format is based on the [ISO.8601.2004] duration representation basic format with designators for the duration of time. The format can represent nominal durations (weeks and days) and accurate durations (hours, minutes, and seconds). The syntax is further defined in Appendix A, "Duration" section of [RFC3339].

Example value:

```
P3M
```

5.21.1. LDAP Attribute Definition

Definition of the bookingwindowstart LDAP attribute:

```
( 1.3.6.1.1.x.0.14
  NAME 'BookingWindowStart'
  DESC 'Cal Booking Window Start'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26
  SINGLE-VALUE )
```

5.21.2. VCard Property Definition

Purpose: To specify how much time in advance the resource can be booked.

Type value: duration.

The format is based on the [ISO.8601.2004] duration representation basic format with designators for the duration of time. The format can represent nominal durations (weeks and days) and accurate durations (hours, minutes, and seconds). The syntax is further defined in Appendix A, "Duration" section of [RFC3339].

Cardinality: (0,1)

ABNF:

```
BOOKINGWINDOWSTART-param = "VALUE=text" / any-param
BOOKINGWINDOWSTART-value = text
```

Example:

```
BOOKINGWINDOWSTART:P3M
```

5.22. BookingWindow End

Description:

Defines how much time in advance the resource booking is closed. The value of this property is used to calculate the latest date and time when a resource can be reserved for an event starting on a specific date and time.

If the current time is equal to or before the value obtained by subtracting BookingWindowEnd from the start date and time of the event, then the resource may be booked. If this property is absent, then the resource may be booked anytime from booking window start to the start of the event.

BookingWindow Start and End together provide the window of time a resource can be booked, relative to the start time of the event.

```
If BookingWindowStart = BwS,
BookingWindowEnd = BwE,
Current Time = CT and
Event Start Time = ST,
a resource can be booked at a certain time only if
CT is equal to or after (ST - BwS)
and CT is equal to or before (ST - BwE)
```

ValueType: Duration value.

The format is based on the [ISO.8601.2004] duration representation basic format with designators for the duration of time. The format can represent nominal durations (weeks and days) and accurate durations (hours, minutes, and seconds). The syntax is further defined in Appendix A, "Duration" section of [RFC3339].

Example value:

P5D

5.22.1. LDAP Attribute Definition

Definition of the bookingwindowend LDAP attribute:

```
( 1.3.6.1.1.x.0.15
  NAME 'BookingWindowEnd'
  DESC 'Cal Booking Window End'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26
  SINGLE-VALUE )
```

5.22.2. VCard Property Definition

Purpose: To specify how much time in advance the resource booking is closed.

Type value: duration.

The format is based on the [ISO.8601.2004] duration representation basic format with designators for the duration of time. The format can represent nominal durations (weeks and days) and accurate durations (hours, minutes, and seconds). The syntax is further defined in Appendix A, "Duration" section of [RFC3339].

Cardinality: (0,1)

ABNF:

```
BOOKINGWINDOWEND-param = "VALUE=text" / any-param
BOOKINGWINDOWEND-value = text
```

Example:

BOOKINGWINDOWEND:P5D

5.23. Scheduling Approval Info

Description:

Information regarding approval of a scheduling request to the resource.

ValueType:
Object value.

5.23.1. LDAP ObjectClass Definition

Definition of the schedapprovalinfo LDAP objectclass:

```
( 1.3.6.1.1.x.1.4
  NAME 'SchedApprovalInfo'
  DESC 'Calendar Sched Approval Class'
  SUP CalendarResource
  AUXILIARY
  MAY (autoschedule $ approvalinfofourl $ schedadmin) )
```

5.23.2. Auto schedule

Description:
No approval required. Automatically scheduled.

ValueType:
Boolean value.

Example value:
TRUE

5.23.2.1. LDAP Attribute Definition

Definition of the autoschedule LDAP attribute:

```
( 1.3.6.1.1.x.0.16
  NAME 'Autoschedule'
  DESC 'Cal Scheduling no approval required'
  EQUALITY booleanMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.7
  SINGLE-VALUE )
```

5.23.2.2. VCard Property Definition

Purpose: To specify if invitations should be automatically scheduled.

Type value: Boolean.

Cardinality: (0,1)

ABNF:

```
AUTOSCHEDULE-param = "VALUE=boolean" / any-param
AUTOSCHEDULE-value = "TRUE" / "FALSE"
```

Example:

```
AUTOSCHEDULE:TRUE
```

5.23.3. Approval Info URL

Description:

URL pointing to complete information on scheduling request approval process for the resource.

ValueType:

URL value.

Example value:

```
http://www.example.com/room1_approval.html
```

5.23.3.1. LDAP Attribute Definition

Definition of the approvalinfourl LDAP attribute:

```
( 1.3.6.1.1.x.0.17
  NAME 'ApprovalInfoURL'
  DESC 'Cal Sched Approval Info'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.23.3.2. VCard Property Definition

Purpose: To specify URL pointing to Scheduling Approval Information.

Type value: URI.

Cardinality: (0,n)

ABNF:

```
APPROVALINFO-param = "VALUE=uri" / any-param
APPROVALINFO-value = uri
```

Example:

```
APPROVALINFO:http://www.example.com/room1_approval.html
```

5.23.4. Scheduling Admin Contact

Description:

Contact information for the scheduling approvers, if approval required.

ValueType:

URL value.

Example value:

<http://www.example.com/SchedAdmin1.vcf>

5.23.4.1. LDAP Attribute Definition

Definition of the schedadmin LDAP attribute:

```
( 1.3.6.1.1.x.0.18
  NAME 'SchedAdmin'
  DESC 'Cal Sched Admin Info'
  EQUALITY distinguishedNameMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.12 )
```

5.23.4.2. VCard Property Definition

Purpose: To specify URL pointing to Scheduling Manager.

Type value: URI.

Cardinality: (0,n)

ABNF:

```
SCHEDADMIN-param = "VALUE=uri" / any-param
SCHEDADMIN-value = uri
```

Example:

SCHEDADMIN:<http://www.example.com/SchedAdmin1.vcf>

5.24. Cost

Description:

Scheduling costs for this resource.

ValueType:

Object value.

5.24.1. LDAP ObjectClass Definition

Definition of the cost LDAP objectclass:

```
( 1.3.6.1.1.x.1.5
  NAME 'CalendarResourceCost'
  DESC 'Calendar Resource Cost Object Class'
  SUP CalendarResource
  AUXILIARY
  MAY (nocost $ costurl)
```

5.24.2. Nocost

Description:

No cost for using the resource. Can be used for a resource scheduling query.

ValueType:

Boolean value.

Example value:

TRUE

5.24.2.1. LDAP Attribute Definition

Definition of the nocost LDAP attribute:

```
( 1.3.6.1.1.x.0.19
  NAME 'Nocost'
  DESC 'Free or Priced resource'
  EQUALITY booleanMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.7
  SINGLE-VALUE )
```

5.24.2.2. VCard Property Definition

Purpose: To specify if resource usage is free.

Type value: A single boolean value.

Cardinality: (0,1)

ABNF:

```
NOCOST-param = ; no parameter allowed
NOCOST-value = boolean
```

Example:
NOCOST:TRUE

5.24.3. Cost URL

Description:
URL pointing to complete pricing information for usage of the resource.

ValueType:
URL value.

Example value:
<http://www.example.com/cost.html>

5.24.3.1. LDAP Attribute Definition

Definition of the costurl LDAP attribute:

```
( 1.3.6.1.1.x.0.20
  NAME 'CostURL'
  DESC 'Cal Resource Cost Info'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

5.24.3.2. VCard Property Definition

Purpose: To specify URL pointing Resource Scheduling Cost Information.

Type value: URI.

Cardinality: (0,n)

ABNF:
COSTINFO-param = "VALUE=uri" / any-param
COSTINFO-value = uri

Example:
COSTINFO:<http://www.example.com/cost.html>

5.25. Related

Description:
Specify a relationship with another resource.

ValueType:
URL value.

Example value:
<http://www.example.com/printer1.html>

5.25.1. LDAP Attribute Definition

Definition of the related LDAP attribute:

```
( 1.3.6.1.1.x.0.21
  NAME 'Related'
  DESC 'Related URL'
  EQUALITY uniqueMemberMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.34 )
```

5.25.2. VCard Property Definition

The property RELATED as defined in Section 6.6.6 of [RFC6350].

6. Examples

6.1. LDAP Examples

6.1.1. Location Resource

```
dn: cn=Room One,ou=Engineering,dc=example,dc=com
objectclass: top
objectclass: calendarresource
objectclass: admittanceinfo
objectclass: inventoryinfo
objectclass: schedapprovalinfo
objectclass: calendarresourcecost
objectclass: room
vcarduid: room1-id
cn: Room One
ou: Engineering
nickname: The One
description: Room 1 in Engineering Building X
categories: rooms
categories: engineering_resources
restricted: TRUE
admittanceurl: http://www.example.com/room1_admittance.html
accessibilityurl: http://www.example.com/room1_specialaccess.html
capacity: 100
inventorylist: phone
inventorylist: projector
inventoryurl: http://www.example.com/room1_inventory.html
owner: cn=RoomOwner,ou=Engineering,dc=example,dc=com
resourcemanager: cn=RoomOwner,ou=Engineering,dc=example,dc=com
calcapuri: http://www.example.com/calendar/home/Room1/calendar/
calfburl: http://www.example.com/freebusy/home/Room1/
calcaladruri: mailto:room1@example.com
timezoneid: America/Los_Angeles
multiplebookings: 1
maxinstances: 10
bookingwindowstart: P3M
bookingwindowend: P3D
autoschedule: FALSE
approvalinfourl: http://www.example.com/room1_approval.html
schedadmin: cn=RoomOwner,ou=Engineering,dc=example,dc=com
nocost: FALSE
costurl: http://www.example.com/cost.html
```

6.1.2. Role Resources Group

```
dn: cn=Drivers X,ou=Transportation,dc=example,dc=com
objectclass: top
objectclass: groupOfuniqueNames
objectclass: calendarresource
objectclass: schedapprovalinfo
objectclass: calendarresourcecost
vcarduid: driversX-id
cn: Driver One
ou: Transportation
nickname: The X
description: Drivers in the Transportation department driver pool X
categories: drivers
uniquemember: cn=Driver1,ou=Transportation,dc=example,dc=com
uniquemember: cn=Driver2,ou=Transportation,dc=example,dc=com
uniquemember: cn=Driver3,ou=Transportation,dc=example,dc=com
owner: cn=Transportation_Manager,ou=Transportation,dc=example,dc=com
calfburl: http://www.example.com/freebusy/home/DriversX/
calcaladruri: mailto:driversX@example.com
timezoneid: America/Los_Angeles
multiplebookings: 3
maxinstances: 10
bookingwindowstart:P3M
bookingwindowend: P3D
autoschedule: FALSE
approvalinfourl: http://www.example.com/driversX_approval.html
schedadmin: cn=TransportationManager,ou=Transportation,dc=example,dc=com
nocost: FALSE
costurl: http://www.example.com/driversXcost.html
```

6.2. VCard Examples

6.2.1. Location Resource


```
BEGIN:VCARD
VERSION:4.0
UID:urn:uuid:room1-id
KIND: location
FN: Room One
ORG: Engineering
NICKNAME: The One
NOTE: Room 1 in Engineering Building X
CATEGORIES: rooms, engineering_resources
RESTRICTEDACCESS: TRUE
ADMISSIONINFO: http://www.example.com/room1_admittance.html
ACCESSIBILITYINFO: http://www.example.com/room1_specialaccess.html
CAPACITY: 100
INVENTORYLIST: phone, projector
INVENTORYURL: http://www.example.com/room1_inventory.html
RESOURCEOWNER: http://www.example.com/ResOwner1.vcf
RESOURCEMANAGER: http://www.example.com/ResManager1.vcf
CAPURI: http://www.example.com/calendar/home/Room1/calendar/
FBURL: http://www.example.com/freebusy/home/Room1/
CALADRURI: mailto:room1@example.com
TZ: America/Los_Angeles
MULTIBOOK: 1
MAXINSTANCES: 10
BOOKINGWINDOWSTART:P3M
BOOKINGWINDOWEND: P3D
AUTOSCHEDULE: FALSE
APPROVALINFO: http://www.example.com/room1_approval.html
SCHEDADMIN: http://www.example.com/SchedAdmin1.vcf
NOCOST: FALSE
COSTINFO: http://www.example.com/cost.html
END:VCARD
```

6.2.2. Role Resources Group

```
BEGIN:VCARD
VERSION:4.0
UID:urn:uuid:driverXPool-id
KIND: group
FN: Driver X Pool
ORG: Transportation
NICKNAME: The X Group
NOTE: Drivers in the Transportation department driver pool X
CATEGORIES: drivers
MEMBER:urn:uuid:driver1-id
MEMBER:urn:uuid:driver2-id
MEMBER:urn:uuid:driver3-id
RESOURCEOWNER: http://www.example.com/DriversManager.vcf
FBURL: http://www.example.com/freebusy/home/DriversX/
CALADRURI: mailto:driversX@example.com
TZ: America/Los_Angeles
MULTIBOOK: 3
MAXINSTANCES: 10
BOOKINGWINDOWSTART:P3M
BOOKINGWINDOWEND: P3D
AUTOSCHEDULE: FALSE
APPROVALINFO: http://www.example.com/driversX_approval.html
SCHEDADMIN: http://www.example.com/DriversX_SchedAdmin.vcf
NOCOST: FALSE
COSTINFO: http://www.example.com/driversXcost.html
END:VCARD
```

7. Security Considerations

As this document only defines schema for representing resource information for calendaring and scheduling and does not refer to the actual storage mechanism itself, or the calendaring and scheduling protocol, no special security considerations are required as part of this document.

8. IANA Considerations

8.1. LDAP Objectclass and Attribute Registration

New LDAP objectclasses and attributes defined in this document need to be registered by the Internet Assigned Numbers Authority (IANA) as requested in the following template. Once the assignment is done, this document needs to be updated with the right OID numbers for all the newly defined objectclasses and attributes.

Subject: Request for LDAP Descriptor Registration
 Descriptor (short name): See table below
 Object Identifier: See table below
 Person & email address to contact for further information:
 Ciny Joy <ciny.joy@oracle.com>
 Usage: See table below
 Specification: draft-cal-resource-schema
 Author/Change Controller: IESG

New LDAP ObjectClass and Attributes Table:

Name	Type	Definition	OID
CalendarResource	ObjectClasses	Section 4.1	IANA-ASSIGNED-OID
Kind	Attribute	Section 5.2.1.1	IANA-ASSIGNED-OID
VcardUid	Attribute	Section 5.3.1	IANA-ASSIGNED-OID
NickName	Attribute	Section 5.4.1	IANA-ASSIGNED-OID
Categories	Attribute	Section 5.7.1	IANA-ASSIGNED-OID
AdmittanceInfo	ObjectClasses	Section 5.9.1	IANA-ASSIGNED-OID
Restricted	Attribute	Section 5.9.2.1	IANA-ASSIGNED-OID
AdmittanceURL	Attribute	Section 5.9.3.1	IANA-ASSIGNED-OID
AccessibilityURL	Attribute	Section 5.10.1	IANA-ASSIGNED-OID
Capacity	Attribute	Section 5.11.1	IANA-ASSIGNED-OID
InventoryInfo	ObjectClasses	Section 5.12.1	IANA-ASSIGNED-OID
InventoryList	Attribute	Section 5.12.2.1	IANA-ASSIGNED-OID
InventoryURL	Attribute	Section 5.12.3.1	IANA-ASSIGNED-OID
ResourceManager	Attribute	Section 5.14.1	IANA-ASSIGNED-OID
TimeZoneID	Attribute	Section 5.18.1	IANA-ASSIGNED-OID
MultipleBookings	Attribute	Section 5.19.1	IANA-ASSIGNED-OID
MaxInstances	Attribute	Section 5.20.1	IANA-ASSIGNED-OID

BookingWindowStart	Attribute	Section 5.21.1	IANA-ASSIGNED-0 ID
BookingWindowEnd	Attribute	Section 5.22.1	IANA-ASSIGNED-0 ID
SchedApprovalInfo	ObjectClasses	Section 5.23.1	IANA-ASSIGNED-0 ID
Autoschedule	Attribute	Section 5.23.2	IANA-ASSIGNED-0 ID
ApprovalInfoURL	Attribute	Section 5.23.3	IANA-ASSIGNED-0 ID
SchedAdmin	Attribute	Section 5.23.4	IANA-ASSIGNED-0 ID
CalendarResourceCost	ObjectClasses	Section 5.24.1	IANA-ASSIGNED-0 ID
Nocost	Attribute	Section 5.24.2	IANA-ASSIGNED-0 ID
CostURL	Attribute	Section 5.24.3	IANA-ASSIGNED-0 ID
Related	Attribute	Section 5.25.1	IANA-ASSIGNED-0 ID

8.2. VCard Property and Value Registration

The following new VCard Properties need to be registered by IANA.

New VCard Properties Table:

VCard Property Name	VCard Property Definition
RESTRICTEDACCESS	Section 5.9.2.2
ADMISSIONINFO	Section 5.9.3.2
ACCESSIBILITYINFO	Section 5.10.2
CAPACITY	Section 5.11.2
INVENTORYLIST	Section 5.12.2.2
INVENTORYURL	Section 5.12.3.2
RESOURCEOWNER	Section 5.13.2
RESOURCEMANAGER	Section 5.14.2
MAXINSTANCE	Section 5.20.2
BOOKINGWINDOWSTART	Section 5.21.2
BOOKINGWINDOWEND	Section 5.22.2
AUTOSCHEDULE	Section 5.23.2.2
APPROVALINFO	Section 5.23.3.2
SCHEDADMIN	Section 5.23.4.2
NOCOST	Section 5.24.2.2
COSTINFO	Section 5.24.3.2

The following new VCard Property Values need to be registered by IANA.

New VCard Property Values Table:

VCARD Property Name	Additional VCard Property Value	Value Definition
KIND	calendarresource	Section 5.2.2

9. Recommendations for Calendaring Systems

While this document does not mandate how each of the defined attribute values must be used by calendaring systems, here are some recommendations:

1. BookingWindow Start (Section 5.21), Booking Window End (Section 5.22), and Multiple Bookings (Section 5.19) information should be used in freebusy calculations. A query for a time slot that falls outside the booking window or one that already has the maximum allowed number of simultaneous bookings, must be returned as BUSY_UNAVAILABLE.
2. Calendaring systems that support the auto schedule (Section 5.23.2) attribute, should automatically mark the attendee PARTSTAT for a resource as ACCEPTED, if its auto schedule value is TRUE and the scheduling is successful. If owner approval is required, the PARTSTAT could be automatically marked as TENTATIVE.
3. Information like Capacity (Section 5.11) can be used by calendaring systems to warn end users if the number of attendees exceed the capacity value.

10. Acknowledgments

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11. Normative References

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