



A White Paper
by NetMesh Inc.
www.netmesh.us

A Comparison of Identity Vocabularies

**Liberty Alliance, LDAP, Windows CardSpace ("InfoCard"),
Sxip, OpenID SREG Extension, Light-Weight Identity (LID)**

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Feedback appreciated on this wiki page:
http://lid.netmesh.org/wiki/Talk:Identity_Vocabularies_Comparison

Special thanks to those who provided feedback on earlier drafts:

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Introduction

A number of proposals for the exchange of identity information has been made in recent years. At the heart of these proposals are the actual vocabularies (aka schemas, models, ontologies, the "meta-data") of the identity information that can be exchanged. In this paper, we attempt to compare these vocabularies on an atomic, data element basis.

Each of the proposals has a vocabulary extensibility mechanism of some kind, so in theory, each proposal can exchange any kind of identity information. However, in practice, implementations are only interoperable if they agree on the semantics of the vocabulary; the very purpose of this paper is to compare the vocabularies that the proposals pre-define to see how expressive they are without extensibility.

The underlying schema languages for the different proposals often differ dramatically (e.g. XML Schema vs. XML document types vs. name-value pairs etc.). Not surprisingly, the expressiveness of the vocabularies is correspondingly very different. We attempted to compare them as completely as possible, but in some cases we took shortcuts; for example, we did not attempt to list all the combinations of "work", "home", "preferred" and other qualifiers on data elements such as phone number. On cursory reading, this may create the incorrect impression of equivalent expressiveness with other schemes that do not have that flexibility.

To describe the location of each data element in the various vocabularies that use a hierarchical scheme of some kind, we use an ad-hoc syntax that resembles XPath. We hope it strikes a reasonable balance between precision and comprehensibility across so many different schema languages.

Some of the proposals define data elements that are out of scope for this analysis; for example, LDAP knows a 'protocolInformation'. We silently ignored those data elements.

Given that some of these proposals may still be in flux, and our potentially limited understanding of any of them, it is entirely possible that this paper contains substantial errors or omissions. We'd be grateful if you could notify us of any issues that you encounter. Contact information is on the front page.

Comparison

<i>Description</i>	<i>Liberty</i>	<i>LDAP</i>	<i>CardSpace</i>	<i>Sxip V1</i>	<i>Sxip V2</i>	<i>OpenID/SREG</i>	<i>LID</i>
Name prefix, such as "Dr."	PP/AnalyzedName/PersonalTitle PP/AnalyzedName/LocalizedName (localized)	personalTitle	–	/sxip/namePerson/prefix	/sxip.net/namePerson/prefix	–	/VCARD/N/PREFIX
First, or given name	PP/AnalyzedName/FirstName PP/AnalyzedName/LocalizedName (localized)	givenName	GivenName	/sxip/namePerson/first	/sxip.net/namePerson/first	–	/VCARD/N/GIVEN
Last, or family name	PP/AnalyzedName/Surname PP/AnalyzedName/LocalizedName (localized)	sn	Surname	/sxip/namePerson/last	/sxip.net/namePerson/last	–	/VCARD/N/FAMILY
Middle name	PP/AnalyzedName/MiddleName PP/AnalyzedName/LocalizedName (localized)	–	–	/sxip/namePerson/middle	/sxip.net/namePerson/middle	–	/VCARD/N/MIDDLE
Name suffix, such as "PhD"	–	generationQualifier	–	/sxip/namePerson/suffix	/sxip.net/namePerson/suffix	–	/VCARD/N/SUFFIX
Initials	–	initials	–	–	–	–	–

Description	Liberty	LDAP	CardSpace	Sxip V1	Sxip V2	OpenID/SREG	LID
Nick name, aka screen name	PP/InformalName, PP/LInformalName (localized) /PP/AddressCard/Nick /PP/AddressCard/Nick (localized) /EP/CorpCommonName/CN /EP/CorpCommonName/LCN (localized) /EP/CorpCommonName/AltCN /EP/CorpCommonName/LAltCN (localized)	–	–	/sxip/namePerson/friendly	/sxip.net/namePerson/friendly	openid.sreg.nickname	/VCARD/N/NICKNAME
Formatted name	PP/CN PP/LCN (localized) PP/AltCN (Latin) PP/LAltCN (additional, localized)	cn	–	–	–	openid.sreg.fullname	/VCARD/N/FN
Full legal name	PP/LegalIdentity/LegalName PP/LegalIdentity/LLegalName (localized) EP/CorpLegalIdentity/LegalName EP/CorpLegalIdentity/LLegalName (localized)	–	–	–	–	–	–

<i>Description</i>	<i>Liberty</i>	<i>LDAP</i>	<i>CardSpace</i>	<i>Sxip V1</i>	<i>Sxip V2</i>	<i>OpenID/SREG</i>	<i>LID</i>
Fiscal identification number	PP/LegalIdentity/VAT/IDValue EP/CorpLegalIdentity/VAT/IDValue	–	–	–	–	–	–
Fiscal identification number type	PP/LegalIdentity/VAT/IDType EP/CorpLegalIdentity/VAT/IDType	–	–	–	–	–	–
Alternate identification number	PP/LegalIdentity/AltID/IDValue	–	–	–	–	–	–
Alternate identification number type	PP/LegalIdentity/AltID/IDType	–	–	–	–	–	–
Default IM handle	–	–	–	–	/sxip.net/contact/IM/default	–	–
AIM handle	/PP/MsgContact[descendant::MsgTechnology=aol]/MsgAccount	–	–	/sxip/contact/IM/AIM	/sxip.net/contact/IM/AIM	–	–
ICQ handle	/PP/MsgContact[descendant::MsgTechnology=icq]/MsgAccount	–	–	/sxip/contact/IM/ICQ	/sxip.net/contact/IM/ICQ	–	–
MSN IM handle	/PP/MsgContact[descendant::MsgTechnology=msn]/MsgAccount	–	–	/sxip/contact/IM/MSN	/sxip.net/contact/IM/MSN	–	–
Yahoo IM handle	/PP/MsgContact[descendant::MsgTechnology=yahoo]/MsgAccount	–	–	/sxip/contact/IM/Yahoo	/sxip.net/contact/IM/Yahoo	–	–
Jabber handle	–	–	–	–	/sxip.net/contact/IM/Jabber	–	/VCARD/JABBERID

Description	Liberty	LDAP	CardSpace	Sxip V1	Sxip V2	OpenID/SREG	LID
Skype handle	–	–	–	–	/sxip.net/contact/IM/Skype	–	–
Personal URL	/PP/Facade/WebSite	labeledURI	–	/sxip/contact/internetAddresses/web	/sxip.net/contact/web/blog	–	/VCARD/URL
E-mail address	/PP/MsgContact[descendant::MsgTechnology=email]/MsgAccount	mail	EmailAddress	/sxip/contact/internetAddresses/email	/sxip.net/contact/internet/email	openid.sreg.email	/VCARD/EMAIL/USER ID can be qualified with HOME, WORK, PREF
Verified e-mail address	–	–	–	/sxip/contact/internetAddresses/verifiedEmail	–	–	–
Hashed verified e-mail address	–	–	–	/sxip/contact/internetAddresses/verifiedEmailHash	/sxip.net/contact/internet/verifiedemailhash	–	–
LinkedIn URL	–	–	–	–	/sxip.net/contact/web/LinkedIn	–	/VCARD/URL (alias mechanism)
Amazon URL	–	–	–	–	/sxip.net/contact/web/Amazon	–	
Flickr URL	–	–	–	–	/sxip.net/contact/web/Flickr	–	
Del.icio.us URL	–	–	–	–	/sxip.net/contact/web/Delicious	–	
Display language	/PP/Facade/DisplayLanguage	preferredLanguage	–	–	–	–	–
Language	/PP/Facade/Language	–	–	–	–	openid.sreg.language	–

Description	Liberty	LDAP	CardSpace	Sxip V1	Sxip V2	OpenID/SREG	LID
Home Street Address	/PP/AddressCard/Address[descendant::AddressType=home]/PostalAddress /PP/AddressCard/Address[descendant::AddressType=home]/LPostalAddress (localized)	homeAddress	–	/sxip/contact/address/home/streetLine1 /sxip/contact/address/home/streetLine2 /sxip/contact/address/home/streetLine3	–	–	/VCARD/ADR[descendant::HOME]/STREET
Home city or town	/PP/AddressCard/Address[descendant::AddressType=home]/L /PP/AddressCard/Address[descendant::AddressType=home]/L (localized)	–	–	/sxip/contact/address/home/city	–	–	/VCARD/ADR[descendant::HOME]/LOCALITY
Home state	/PP/AddressCard/Address[descendant::AddressType=home]/St /PP/AddressCard/Address[descendant::AddressType=home]/LSt (localized)	–	–	/sxip/contact/address/home/postal-zip	–	–	/VCARD/ADR[descendant::HOME]/REGION
Home zip code	/PP/AddressCard/Address[descendant::AddressType=home]/PostalCode	–	–	/sxip/contact/address/home/state-province	–	–	/VCARD/ADR[descendant::HOME]/PCODE
Home country	/PP/AddressCard/Address[descendant::AddressType=home]g=/C	–	–	/sxip/contact/address/home/country	–	–	/VCARD/ADR[descendant::HOME]/CTRY

<i>Description</i>	<i>Liberty</i>	<i>LDAP</i>	<i>CardSpace</i>	<i>Sxip V1</i>	<i>Sxip V2</i>	<i>OpenID/SREG</i>	<i>LID</i>
	Note: Liberty also knows the same structure for "domicile" (the legal residence), "vacation" (holiday address) and "emergency" (emergency contact)	–	–	–	–	–	–
Preferred street address	–	street	StreetAddress	–	–	–	/VCARD/ADR[descendant::PREF] /STREET
Preferred city or town	–	l	Locality	–	–	–	/VCARD/ADR[descendant::PREF]/LOCALITY
Preferred state	–	st	StateOrProvince	–	–	–	/VCARD/ADR[descendant::PREF]/REGION
Preferred zip code	–	postlaCode	PostalCode	–	–	openid.sreg.postcode	/VCARD/ADR[descendant::PREF]/PCODE
Preferred country	–	c	Country	–	–	openid.sreg.country	/VCARD/ADR[descendant::PREF]/CTRY
Address label	–	–	–	–	–	–	/VCARD/LABEL/ N lines. Can be qualified with HOME, WORK, POSTAL, PARCEL, PREF
Identifies house within a location	–	houseIdentifier	–	–	–	–	–
Primary phone number	–	telephoneNumber	PrimaryPhone	–	/sxip.net/contact/phone/default	–	/VCARD/TEL[descendant::PREF][descendant::VOICE]/NUMBER

Description	Liberty	LDAP	CardSpace	Sxip V1	Sxip V2	OpenID/SREG	LID
Home phone number	/PP/MsgContact[descendant::MsgTechnology=pots][descendant::MsgType=personal]/MsgAccount	homePhone	–	/sxip/contact/phone/home	/sxip.net/contact/phone/home	–	/VCARD/TEL[descendant::HOME][descendant::VOICE]/NUMBER
Business phone number	/PP/MsgContact[descendant::MsgTechnology=pots][[descendant::MsgType=work]/MsgAccount	telephoneNumber	–	/sxip/contact/phone/business	/sxip.net/contact/phone/business	–	/VCARD/TEL[descendant::WORK][descendant::VOICE]/NUMBER
Cell phone number	/PP/MsgContact[descendant::MsgTechnology=mobile]/MsgAccount	mobile	–	/sxip/contact/phone/cell	/sxip.net/contact/phone/cell	–	/VCARD/TEL[descendant::CELL][descendant::VOICE]/NUMBER
Pager number	/PP/MsgContact[descendant::MsgTechnology=pager]/MsgAccount	pager	–	–	–	–	/VCARD/TEL[descendant::PAGER]/NUMBER
Fax number	/PP/MsgContact[descendant::MsgTechnology=fax]/MsgAccount	facsimileTelephoneNumber	–	/sxip/contact/phone/fax	/sxip.net/contact/phone/fax	–	/VCARD/TEL[descendant::FAX]/NUMBER
Date of birth	/PP/LegalIdentity/DOB	–	DateOfBirth	/sxip/birthDate/birthYear	/sxip.net/birthDate/birthYear	openid.sreg.dob	/VCARD/BDAY
				/sxip/birthDate/birthMonth	/sxip.net/birthDate/birthMonth		
				/sxip/birthDate/birthDay	/sxip.net/birthDate/birthDay		
Birthday (without year)	/PP/Facade/Birthday	–	–	–	–	–	–
Age	/PP/Facade/Age	–	–	–	–	–	–

<i>Description</i>	<i>Liberty</i>	<i>LDAP</i>	<i>CardSpace</i>	<i>Sxip V1</i>	<i>Sxip V2</i>	<i>OpenID/SREG</i>	<i>LID</i>
Unique identifier for disambiguation	–	x500UniqueIdentifier	–	–	–	–	–
Qualifier to make distinguished name	–	dnQualifier	–	–	–	–	–
?	?	–	PrivatePersonalIdentifier	–	–	–	–
Password	–	userPassword	–	–	–	–	–
Certificate	–	userCertificate	–	–	–	–	–
Directory management domain	–	dmdName	–	–	–	–	–
Gender	/PP/LegalIdentity/Gender	–	Gender	–	–	openid.sreg.gender	–
Marital status	/PP/LegalIdentity/MaritalStatus	–	–	–	–	–	–
?	–	–	Username	–	–	–	–
?	–	–	UserPrincipalName	–	–	–	–
Business street address	/PP/AddressCard/Address[descendant::AddressType=work]/PostalAddress /PP/AddressCard/Address[descendant::AddressType=work]/LPostalAddress (localized)	–	–	/sxip/contact/address/work/streetLine1 /sxip/contact/address/work/streetLine2 /sxip/contact/address/work/streetLine3	–	–	/VCARD/ADR[descendant::WORK]/STREET

Description	Liberty	LDAP	CardSpace	Sxip V1	Sxip V2	OpenID/SREG	LID
Business city or town	/PP/AddressCard/Address[descendant::AddressType=work]/L /PP/AddressCard/Address[descendant::AddressType=work]/L (localized)	–	–	/sxip/contact/address/work/city	–	–	/VCARD/ADR[descendant::WORK]/LOCALITY
Business zip code	/PP/AddressCard/Address[descendant::AddressType=work]/St /PP/AddressCard/Address[descendant::AddressType=work]/LSt (localized)	–	–	/sxip/contact/address/work/postal-zip	–	–	/VCARD/ADR[descendant::WORK]/REGION
Business state or province	/PP/AddressCard/Address[descendant::AddressType=work]/PostalCode	–	–	/sxip/contact/address/work/state-province	–	–	/VCARD/ADR[descendant::WORK]/PCODE
Business country	/PP/AddressCard/Address[descendant::AddressType=work]g=/C	–	–	/sxip/contact/address/work/country	–	–	/VCARD/ADR[descendant::WORK]/CTRY
Shipping address	–	postalAddress	–	–	–	–	/VCARD/ADR[descendant::POSTAL]/STREET /VCARD/ADR[descendant::POSTAL]/LOCALITY
Shipping zip code	–	postalCode	–	–	–	–	/VCARD/ADR[descendant::POSTAL]/PCODE
Post office box	–	postOfficeBox	–	–	–	–	/VCARD/ADR/POBOX
Shipping office name	–	physicalDeliveryOfficeName	–	–	–	–	–

<i>Description</i>	<i>Liberty</i>	<i>LDAP</i>	<i>CardSpace</i>	<i>Sxip V1</i>	<i>Sxip V2</i>	<i>OpenID/SREG</i>	<i>LID</i>
Postal address where recipient can accept delivery	–	registeredAddress	–	–	–	–	–
Billing street address	–	–	–	/sxip/contact/address/billTo/streetLine1	–	–	–
				/sxip/contact/address/billTo/streetLine2			
				/sxip/contact/address/billTo/streetLine3			
Billing city or town	–	–	–	/sxip/contact/address/billTo/city	–	–	–
Billing zip code	–	–	–	/sxip/contact/address/billTo/postal-zip	–	–	–
Billing country	–	–	–	/sxip/contact/address/billTo/country	–	–	–
?	–	–	–	/sxip/contact/address/receiptTo/streetLine 1	–	–	–
				/sxip/contact/address/receiptTo/streetLine 2			
				/sxip/contact/address/receiptTo/streetLine 3			
?	–	–	–	/sxip/contact/address/receiptTo/city	–	–	–
?	–	–	–	/sxip/contact/address/receiptTo/postal-zip	–	–	–

<i>Description</i>	<i>Liberty</i>	<i>LDAP</i>	<i>CardSpace</i>	<i>Sxip V1</i>	<i>Sxip V2</i>	<i>OpenID/SREG</i>	<i>LID</i>
?	–	–	–	/sxip/contact/address /receiptTo/state- province	–	–	–
?	–	–	–	/sxip/contact/address /receiptTo/country	–	–	–
Image of the user	/PP/Facade/Mugshot	jpegPhoto	[only image representing the card, not the user]	/sxip/graphic/smallU RI /sxip/graphic/mediu mURI /sxip/graphic/largeU RI	/sxip.net/media/imag e/16x16 /sxip.net/media/imag e/32x32 /sxip.net/media/imag e/48x48 /sxip.net/media/imag e/64x64 /sxip.net/media/imag e/80x80 /sxip.net/media/imag e/128x128 /sxip.net/media/imag e/160x120 /sxip.net/media/imag e/320x240 /sxip.net/media/imag e/640x480 /sxip.net/media/imag e/120x160 /sxip.net/media/imag e/240x320 /sxip.net/media/imag e/480x640 /sxip.net/media/imag e/favicon	–	/VCARD/PHOTO either in-lined as a Base64 value or with HREF
Name of the organization	–	o	–	–	/sxip.net/company/n ame	–	/VCARD/ORG/ORGNA ME

Description	Liberty	LDAP	CardSpace	Sxip V1	Sxip V2	OpenID/SREG	LID
Display name of the organization	/PP/EmploymentIdentity/O /PP/EmploymentIdentity/LO (localized)	–	–	–	–	–	–
URL of the organization	–	–	–	–	–	–	–
Organizational unit	/EP/OU /EP/LOU (localized)	ou	–	–	–	–	/VCARD/ORG/ORGUNIT
The kind of business performed	–	businessCategory	–	–	–	–	–
Employee ID	/EP/EmployeeID /EP/AltEmployeeID	–	–	–	–	–	–
Date of hire	/EP/DateOfHire	–	–	–	–	–	–
Effective start date	/EP/JobStartDate	–	–	–	–	–	–
Status of the employee	/EP/EmployeeStatus	–	–	–	–	–	–
Type of employee	/EP/EmployeeType	–	–	–	–	–	–
ID of the employee's manager	/EP/ManagedEmployeeID	–	–	–	–	–	–
Employee ID if the user is a manager	/EP/SubalternateEmployeeID	–	–	–	–	–	–
Title in the organization	/PP/EmploymentIdentity/JobTitle /PP/EmploymentIdentity/LJobTitle (localized) /EP/InternalJobTitle /EP/LInternalJobTitle (localized)	title	–	–	/sxip.net/company/title	–	/VCARD/TITLE

Description	Liberty	LDAP	CardSpace	Sxip V1	Sxip V2	OpenID/SREG	LID
Role in the organization	–	–	–	–	–	–	/VCARD/ROLE
Logo of the organization	–	–	–	–	–	–	/VCARD/LOGO can be in-lined or HREF
Spoken name of the user	/PP/Facade/NamePronounced	–	–	–	/sxip.net/media/spokenname	–	/VCARD/SOUND/... can be in-lined or HREF
Audio greeting	/PP/Facade/GreetSound	audio	–	–	/sxip.net/media/greeting/audio	–	
Audio greeting for this user	/PP/Facade/GreetMeSound	–	–	–	–	–	
Video greeting	–	–	–	–	/sxip.net/media/greeting/video	–	–
Biography	–	–	–	–	/sxip.net/media/biography	–	–
Time zone	/PP/Facade/TimeZone	–	–	–	–	Openid.sreg.timezon	/VCARD/TZ
Geographical position (latitude)	–	–	–	–	–	–	/VCARD/GEO/LAT
Geographical position (longitude)	–	–	–	–	–	–	/VCARD/GEO/LON
Public key or certificate for signing	/PP/Facade/SignKey	userCertificate	–	–	–	–	/VCARD/KEY[descendant::TYPE=?]/CRED (undefined enum)
Public key or certificate for encryption	/PP/Facade/EncryptKey	–	–	–	–	–	/VCARD/KEY[descendant::TYPE=?]/CRED (undefined enum)

Description	Liberty	LDAP	CardSpace	Sxip V1	Sxip V2	OpenID/SREG	LID
Emergency contact	/PP/EmergencyContact /PP/LEmergencyContact (localized)	–	–	–	–	–	–
Social network information: Individual	/PS/Object[@NodeType='entity']	<i>No equivalent.</i>					RSS extension 'RSS-FOAF': type attribute present
Social network information: Group	/PS/Object[@NodeType='collection']						RSS extension 'RSS-FOAF': group attribute present

More Information

References:

- Liberty Alliance: Liberty ID-SIS Personal Profile Service Specification, Version 1.0
- Liberty Alliance: Liberty ID-SIS Employee Profile Service Specification, Version 1.0
- Liberty Alliance: Liberty ID-WSF People Service Specification, Version 1.0-08
- Lightweight Directory Access Protocol (LDAP): Directory Information Models. RFC 4512.
- Lightweight Directory Access Protocol (LDAP): Schema for User Applications. RFC 4519.
- Microsoft InfoCard schema: <http://schemas.microsoft.com/ws/2005/05/identity/InfoCard.xsd>
- The Sxip Network Properties, 2004-09-20
- SXIP Properties (dix:/sxip.net/simple), 2006-03-24
- SREG extension: <http://www.openidenabled.com/openid/simple-registration-extension>
- NetMesh Inc.: Light-Weight Identity: Introduction. June 2006.
- NetMesh Inc.: VCARD.dtd. <http://lid.netmesh.org/dtds/VCARD.dtd>, see also Jabber Software Foundation: JEP-0054: vcard-temp. <http://www.jabber.org/jeps/jep-0054.html>

NetMesh sites:

- Company site: <http://netmesh.us/>
- LID Developer Website: <http://lid.netmesh.org/>

Of course, NetMesh welcomes your call. Up-to-date contact information can be found on the NetMesh website at <http://www.netmesh.us/>

Changes

From Draft-V1

- Removed SAML column. As several commenters pointed out, SAML does not define a vocabulary in the sense that we are looking at here. The basic vocabulary in the meta data schema has a different goal.
- Added LDAP column.