

Representing Accounts using CASE/UCO

Decision: Designate the Trace object with a general Account property bundle, and enrich the trace with additional property bundles that are specific to the context. When needed, the application specific property bundle contains an embedded reference to an associated Address trace. Multiple Account traces can be linked to a single Identity (physical or virtual) when such relationships exist.

Account property bundle:

- accountIdentifier
- createdTime
- accountExpires
- accountType
- accountIssuer
- isActive
- owner

Overview Diagram

The following diagram provides a general overview of how an Account is represented using CASE, and how it can be linked to associated Addresses, Messages, and Identities.

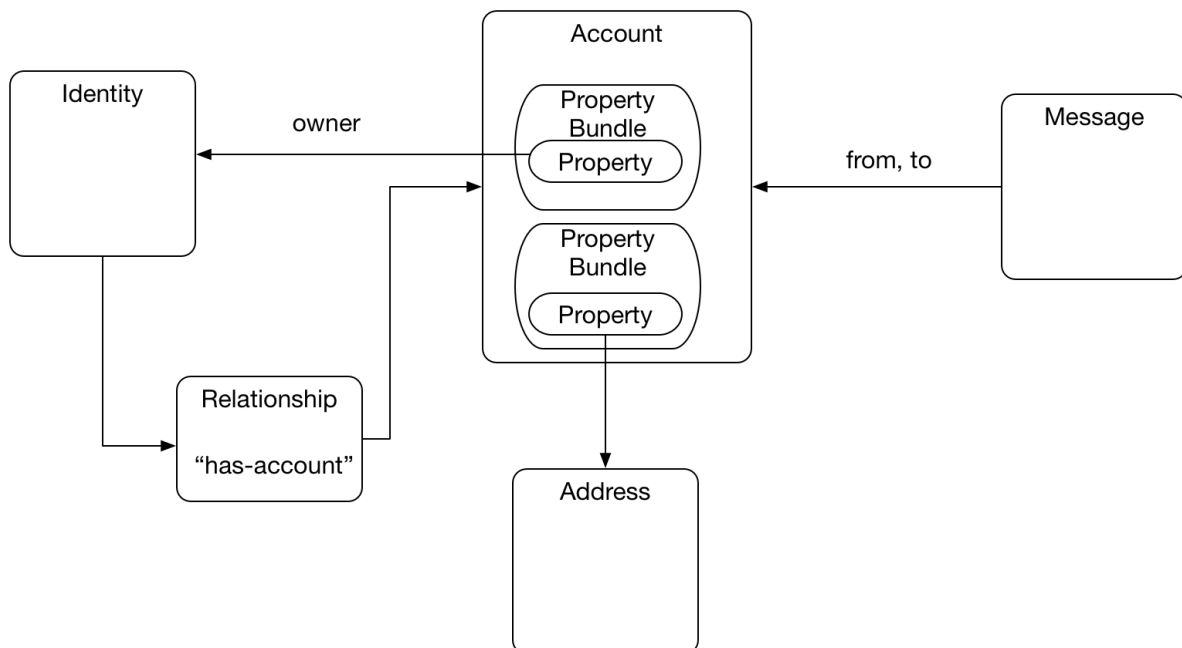


Figure: Depiction of an account trace (e.g., used to send or receive a message) represented using the Account property bundle and an application specific property bundles with an embedded Address reference. Account traces can be linked to an Identity.

Illustrative Example

The following illustrative example is provided to show how Accounts are represented using CASE, and linked to associated objects, including Addresses, Messages, and Identities.

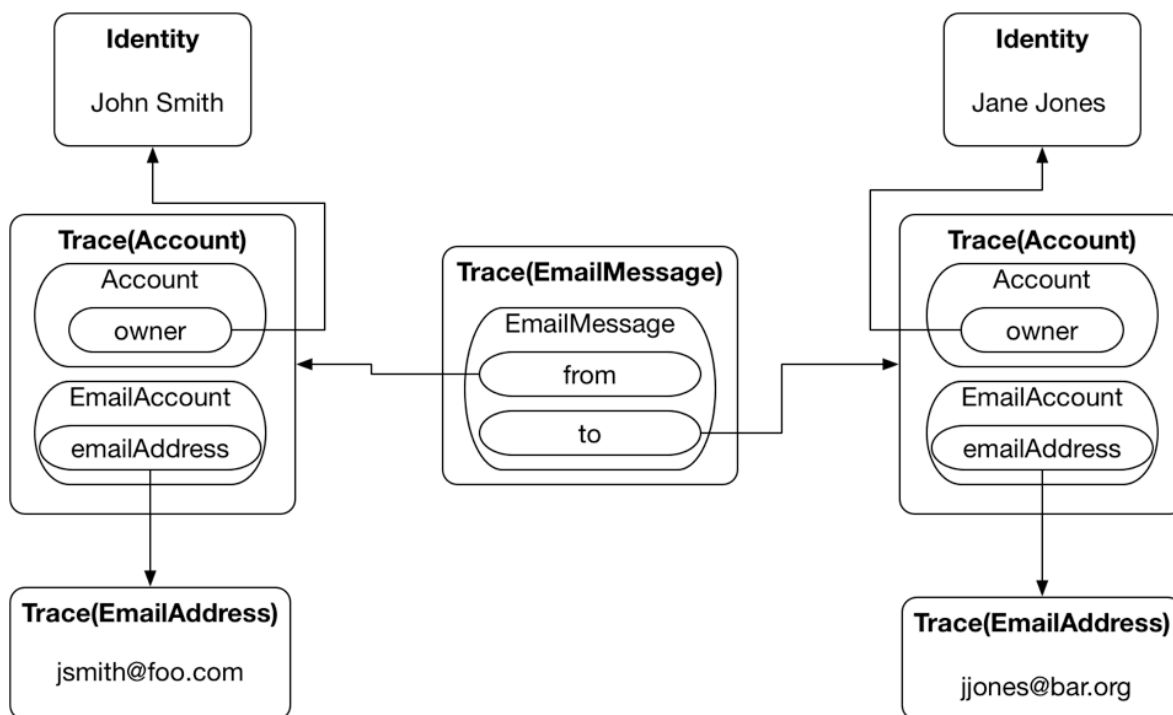


Figure: EmailMessage referencing Account traces (from and to), with Account traces referencing EmailAddress traces. Identities can be linked to accounts when known/available.

Descriptive JSON-LD Examples

The relationship between an Account and an associated digital address is captured using an embedded relationship reference property within the application specific property bundle as shown here for an email account.

```
{
  "@id": "EmailAccount-685fceb3-5354-4b49-9ae0-b3b3c8ba81aa",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "EmailAccount",
      "emailAddress": "EmailAccount-0e8d907a-74a0-484c-93b8-ed2410295bd5"
    }
  ]
},
```

Digital addresses (email, ipv4, ipv6, MAC, etc) by default are captured in dedicated property bundles (EmailAddress, IPv4Address, IPv6Address, MACAddress, etc.).

Sources and targets for messaging are captured as embedded relationship reference properties to account (not address) Traces within message-related property bundles as shown here with an email message:

```

{
  "@id": "email-59e9cf76-08c3-4f0b-a319-2a3b55b54f03",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "EmailMessage",
      "to": ["EmailAccount-bb704188-de16-4743-92fc-b4cba6f9f464"],
      "from": "EmailAccount-bcc67257-331c-4151-8818-1196eb91e7e0",
      "cc": ["EmailAccount-6c0e2c89-05c2-4713-8a2e-51126725c783"],
      "bcc": ["EmailAccount-a41737ad-558c-44a4-8031-40c623b3f07b"],
      "subject": "Example email message",
      "bodyRaw": "(message body)",
      "sender": "EmailAccount-bcc67257-331c-4151-8818-1196eb91e7e0",
      "receivedTime": "2017-03-28T13:44:23.40Z",
      "sentTime": "2017-03-28T13:44:22.19Z",
      "messageID": "CAKBqNfyKo+pvHkJy6kwO82jTbkNA@mail.gmail.com"
    }
  ]
},

```

Related Property Bundles

DigitalAccount

- loginTime
- firstLoginTime
- lastLoginTime
- isDisabled

AccountAuthentication

- Password
- passwordLastChanged

ApplicationAccount=20

- ApplicationRef

EmailAccount

- emailAddressRef

PhoneAccount

- phoneNumber

UNIXAccount

- GID
- Groups
- Shell

UserAccount

- displayName
- homeDirectory
- groups
- isServiceAccount
- isPriveleged
- canEscalatePrivs

WindowsAccount

- lastUnsuccessfulLogon

WindowsActiveDirectoryAccount

- o objectGUID
- o activeDirectoryGroups

Account Examples

1) Facebook account

```
{
  "@id": "facebook_account-687a4791-9ee4-44f2-89b3-e765dcf38d12",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "Account",
      "accountIdentifier": "1235556677@facebook.net",
      "accountIssuer": "facebook_org-d2b9be08-a1be-43f1-840c-80d65250ff77"
    },
    {
      "@type": "DigitalAccount",
      "accountLogin": "xWillyRocksXx",
      "firstLoginTime": "2010-01-21T17:59:43.25Z",
      "lastLoginTime": "2010-03-12T17:59:43.25Z",
      "displayName": "WILLY THE KID",
    },
    {
      "@type": "AccountAuthentication",
      "password": "123secretpassword456",
      "passwordLastChanged": "2010-01-15T17:59:43.25Z"
    },
    {
      "@type": "ApplicationAccount",
      "application": "application-2a8ec696-fab4-4fd8-ae13-ef919aed8796"
    },
    {
      "@type": "SimpleName",
      "givenName": "Willy",
    }
  ]
}
```

```

    "familyName": "Smith"
  },
  {
    "@type": "BirthInformation",
    "birthdate": "1968-09-25T17:59:43.25Z",
  }
]
},

```

2) Windows user account

```

{
  "@id": "windows_user_account-6d31f706-3fbf-42d5-94e9-ae00c3b9391e",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "Account",
      "accountIdentifier": "S-1-5-21-1180699209-877415012-3182924384-500",
      "accountType": "WindowsUser",
      "isActive": true
    },
    {
      "@type": "DigitalAccount",
      "accountLogin": "jdoe",
      "firstLoginTime": "2010-01-21T17:59:43.25Z",
      "lastLoginTime": "2010-03-12T17:59:43.25Z",
      "displayName": "John Doe",
    },
    {
      "@type": "UserAccount",
      "homeDirectory": "\\Users\\jdoe",
      "isPrivileged": "true",
    }
  ]
},

```

3) Phone account

```

{
  "@id": "phone_account-8794b8fa-e5dc-4403-9726-b488e44d96ba",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "Account",
      "accountType": "Phone",
    }
  ]
},

```

```
    "isActive": true
  },
  {
    "@type": "PhoneAccount",
    "phoneNumber": "1237771337",
  }
]
},
```

4) Bank account

```
{
  "@id": "checking_account-6f941e6b-0632-4b8e-9e69-29551992741c",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "Account",
      "accountIdentifier": "123456789987654321",
      "accountType": "Bank-Checking",
      "accountIssuer": "organization-86df03d4-7653-4aba-86e3-2ae27cf32c8e",
      "isActive": true,
      "owner": "person-4b685502-acbd-4d52-86df-38880c277a9d"
    }
  ]
},
```