



Module 4

Identifying, Reusing and Publishing APIs



At the end of this module, you should be able to

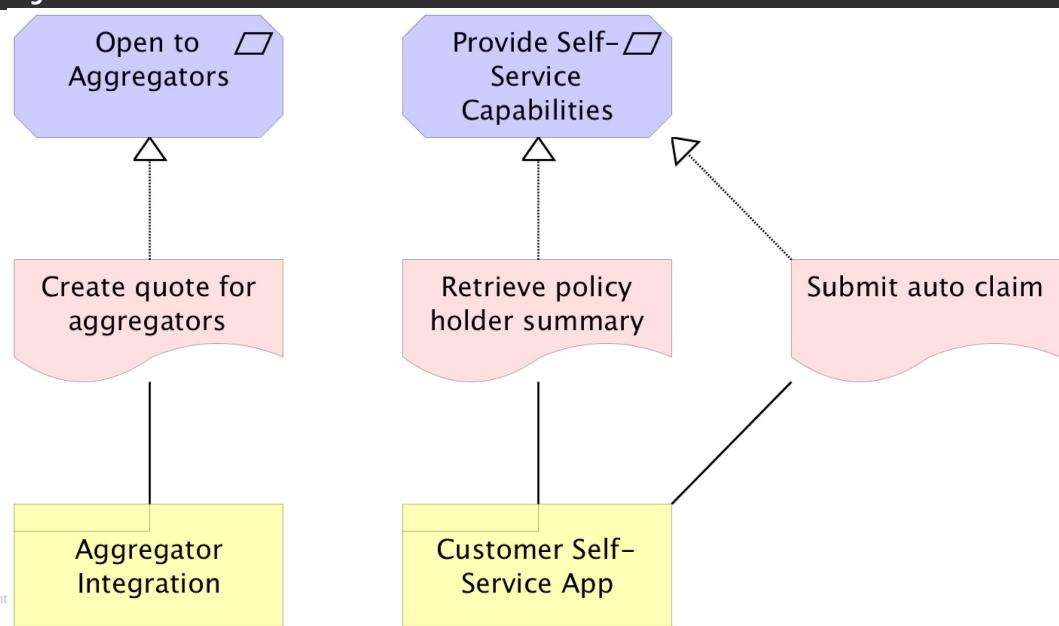


- Map Acme Insurance's planned **strategic initiatives** to products and projects
- **Identify APIs** needed to implement these products
- Assign each API to one of the **three tiers** of API-led connectivity
- Reason about **composition and collaboration** of APIs
- **Reuse APIs** wherever possible
- **Publish APIs and related assets** for reuse
- Understand how **API Community Manager** helps build developer communities around APIs in an application network

Productizing Acme Insurance's strategic initiatives



Translating strategic initiatives into products,
projects and features



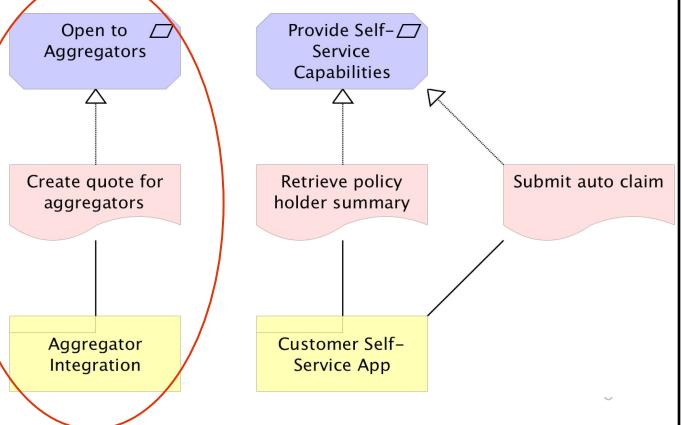
Identifying APIs for the "Aggregator Integration" product



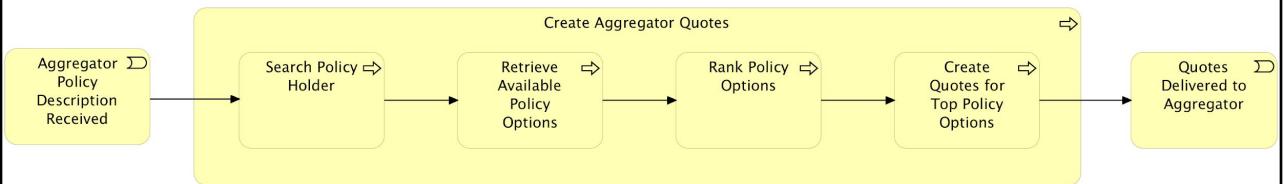
Towards an application network



- "Aggregator Integration" product has **one defining feature**:
 - **"Create quote for aggregators"**
 - Only consider functional requirements for now
- **First API-led connectivity project at Acme Insurance**
 - **Establish** an Enterprise Architecture compatible with an application network
 - Resulting application network will at first be **minimal**



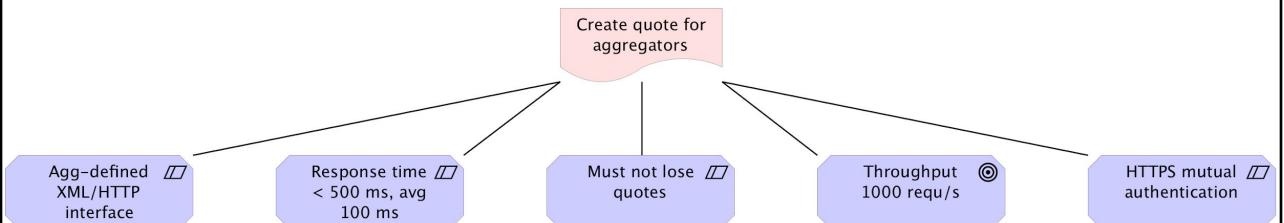
"Create quote for aggregators" business process view



All contents © MuleSoft Inc.

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Looking ahead to NFRs for "Create quote for aggregators"



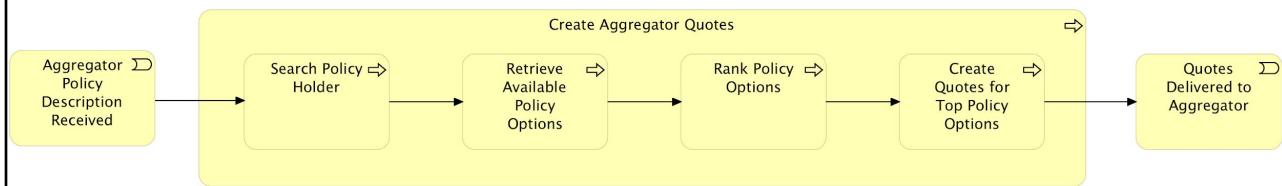
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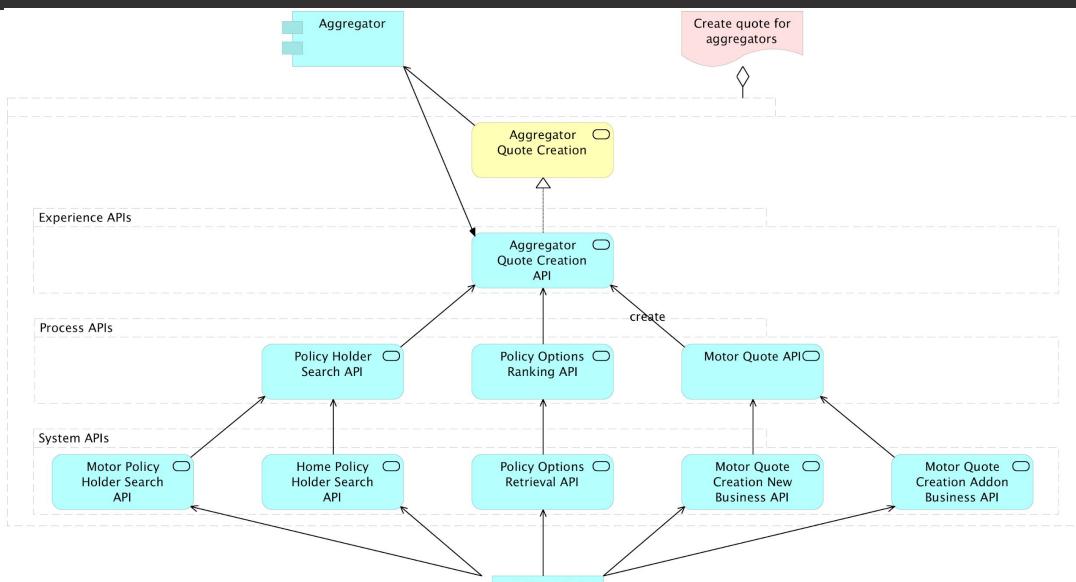
Exercise: Identify APIs for the "Create quote for aggregators" feature



- Using "Create Aggregator Quotes" business process and making assumptions about the capabilities of the Policy Admin System:
- Break down **functionality** of the "Create quote for aggregators" feature into APIs in the 3 tiers of API-led connectivity, and define their interactions:
 - Experience APIs** with interface defined by Aggregator
 - Process APIs** implement and orchestrate business/process logic
 - System APIs** are defined by needs of Process APIs and capabilities of the Policy Admin System



APIs for the "Create quote for aggregators" feature



- "Aggregator Quote Creation EAPI":
 - (Aggregator policy description) → (0-5 ranked motor policy quotes)
- "Policy Holder Search PAPI":
 - (personal identifiers) → (matching policy holders)
- "Policy Options Ranking PAPI":
 - (policy holder properties, policy properties) → (policy options ranked from highest to lowest)
- "Motor Quote PAPI":
 - create: (policy description, policy holder description) → (motor policy quote)

- "Motor Policy Holder Search SAPI":
 - (personal identifiers) → (matching motor policy holders)
- "Home Policy Holder Search SAPI":
 - (personal identifiers) → (matching home policy holders)
- "Policy Options Retrieval SAPI":
 - (policy properties) → (policy options)
- "Motor Quote Creation New Business SAPI":
 - (policy description, policy holder description) → (motor policy quote)
- "Motor Quote Creation Addon Business SAPI":
 - (policy description, policy holder identifier) → (motor policy quote)

Exercise: Pros and cons of fine-grained APIs and API implementations



The previous is an example of a **pronouncedly fine-grained API architecture**.

A break-down of the same functionality into much more **coarse-grained APIs** is equally possible:

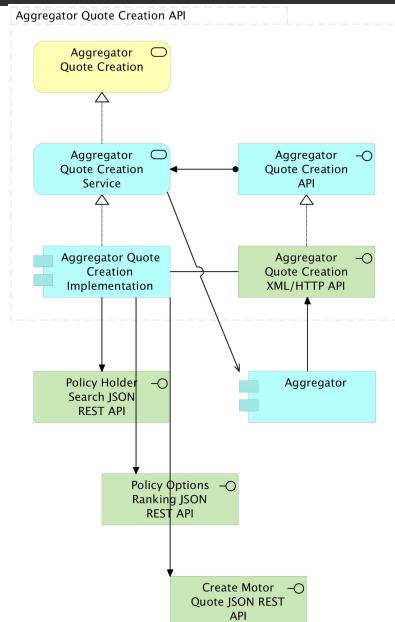
- **Compare and contrast** coarse-grained and fine-grained APIs and API implementations

Solution: Pros and cons of fine-grained APIs and API implementations



- **Deployability:** evolution and rollout of functionality
- **Management:** monitoring, access control, QoS, ...
- **Scalability:** memory, # CPUs, # machines, ... allocated/scaled for each API implementation
- **Resources:** minimum CPUs/vCores, CloudHub workers, ... per API implementations
- **Complexity:** lower complexity of each node in the application network results in higher complexity of entire application network
- **Latency:** API invocations add latency, unless mitigated
- **Failure modes:** address potential failures of remote interactions
- **Team organization:** parallelization of implementation effort
- **Agility and innovation:** cycle times

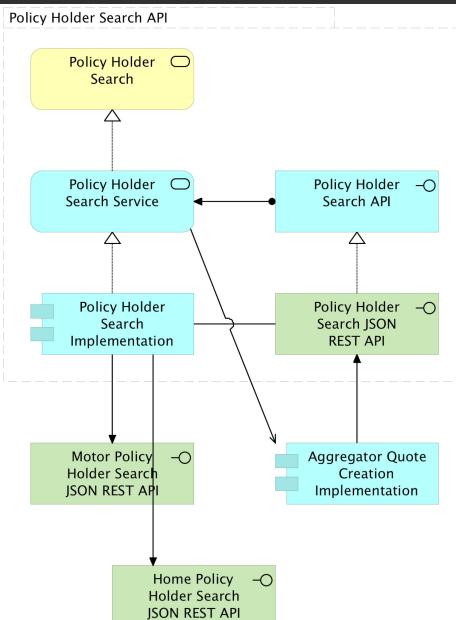
Aggregator Quote Creation EAPI



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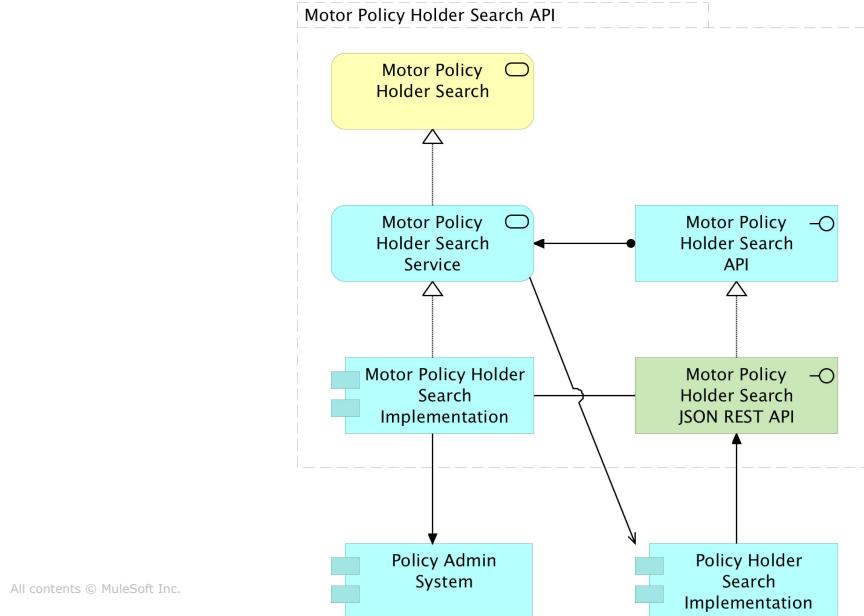
Policy Holder Search PAPI



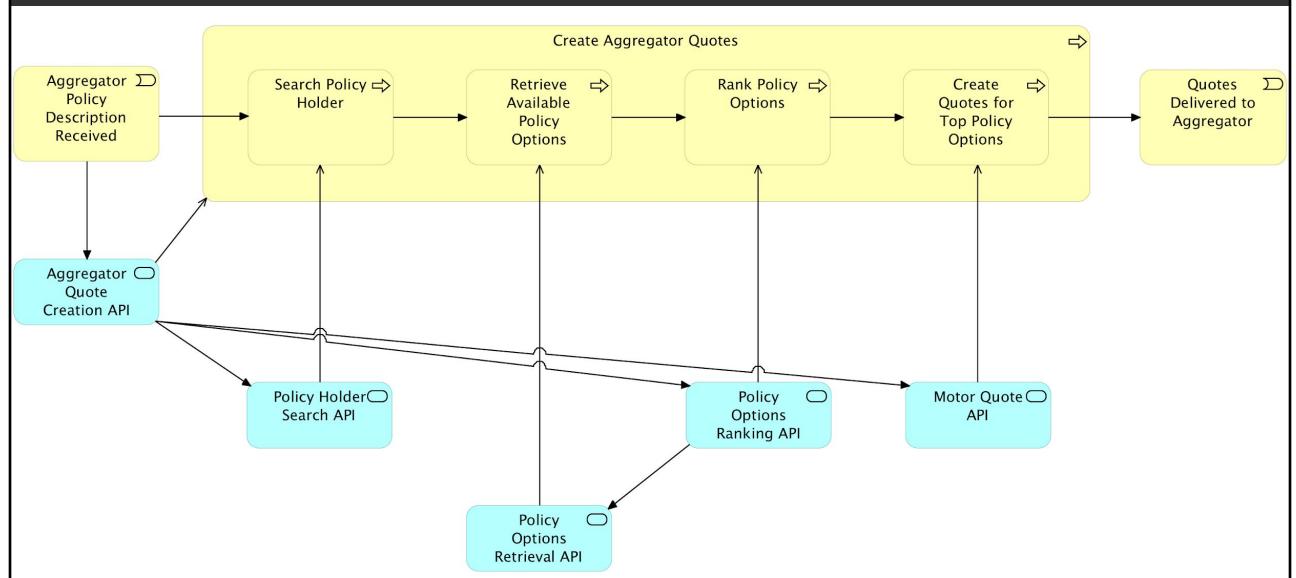
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Motor Policy Holder Search SAPI



API-business alignment



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Exercise: Improve reusability of "Create quote for aggregators" feature APIs



You discover that **other Aggregators use different data formats** for communicating with insurance providers:

1. Analyze the APIs identified so far with respect to their dependency on the data format exchanged with the Aggregator
2. Identify new APIs and refine existing APIs to maximize reuse when other Aggregators will need to be supported in the future
3. Describe as clearly as possible which elements of the currently identified APIs will have to change to accommodate your proposed changes

Solution: Improve reusability of "Create quote for aggregators" feature APIs



1. Only "Aggregator Quote Creation EAPI" depends on Aggregator-defined data format
2. In future: one Experience API per Aggregator
 - a. Common functionality of these Experience APIs encapsulated in a new Process API: "One-Step Motor Quote Creation PAPI"
 - i. Accepts and returns Aggregator-neutral description of policy and quotes
3. Changes:
 - a. "Aggregator Quote Creation EAPI": Interface unchanged, implementation changed significantly to mainly delegate to "One-Step" Process API
 - b. New "One-Step" Process API with implementation similar to current "Aggregator Quote Creation EAPI"
 - c. New Experience APIs, one per Aggregator, delegating to "One-Step" API
 - d. Current Aggregator does not experience any change

Reusing and publishing API-related assets for the "Aggregator Integration" product



Steps to reusing API-related assets



- Attempt **reuse** by finding similar APIs
 - Search Exchange
- **Announce** the fact that the chosen APIs will be implemented
 - Basic **API specification/RAML definition** required for each API
 - Create API spec **in Design Center, export to Exchange**
 - **Version** states **readiness**: v0 for API spec, 0.0.1 for Exchange asset
 - **API portal** automatically rendered in Exchange
- The **C4E** provides guidance and support
 - Defines **naming conventions** for assets published to Exchange

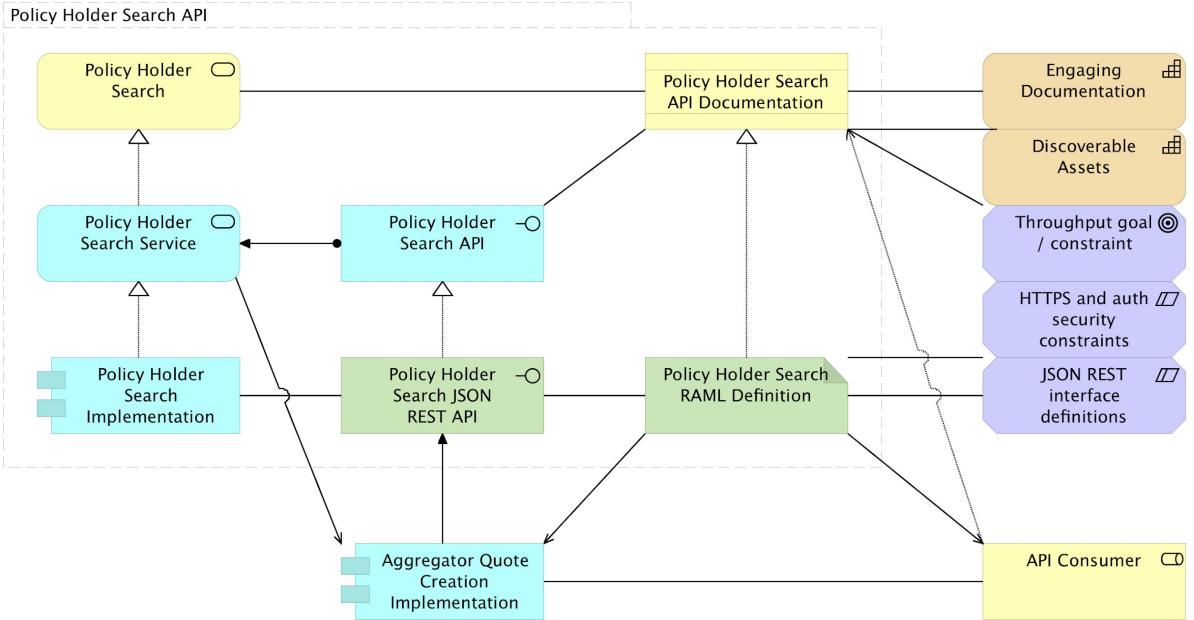
- **RESTful API Modeling Language**
- Language for the **machine- and human-readable** definition of APIs that embody most or all of the principles of REST
 - Uniform interface, stateless, cacheable, client-server, layered system, code on demand
 - Adheres to the HTTP specification in
 - HTTP methods (GET, HEAD, OPTIONS; PUT, DELETE; POST, PATCH; ...)
 - HTTP response status codes
 - HTTP request and response headers
- Comparable to OpenAPI Specification (**OAS**)

- An **API specification** expressed in **RAML**
- Comparable to an **OpenAPI definition**
- Comprising one main **RAML document**, optionally with
 - RAML **fragment** documents
 - XSD and JSON-**Schema** documents
 - **examples**, etc.

- Standard, programming language-agnostic **interface description language for REST APIs**
- **JSON** or **YAML**-based
- Comparable to **RAML**
- “The spec formerly known as **Swagger**”

- An **API specification** that uses and conforms to the OpenAPI Specification (**OAS**)
- Expressed in **JSON** or **YAML**
- Comparable to a **RAML definition**

"Policy Holder Search PAPI" documentation



Using Design Center to sketch and simulate a RAML definition for "Policy Holder Search PAPI"



Policy Holder Search PAPI | master

```

 24   name: Max The Mule
 25   dob: 2006-05-04
 26   Person
 27   description: A person that is a policy holder.
 28   type: Person
 29   properties:
 30     | customerSince?: date-only
 31     | lobs: LoB[]
 32   examples:
 33     | auto-minimal:
 34       | name: Max The Mule
 35       | lobs: [ PersonalMotor ]
 36     | full:
 37       | name: Max The Mule
 38       | dob: 2006-05-04
 39       | customerSince: 2006-05-05
 40       | lobs: [ PersonalMotor, Home ]
 41
 42 /policyHolders:
 43   | description: |
 44   |   Policy holders of any policy of a personal LoB, such that the policy holders
 45   |   are people.
 46   |   get:
 47   |     description: Search for policy holders matching the query parameters.
 48   |     queryParameters:
 49   |       | name?:
 50   |         | type: string
 51   |         | description: A case-insensitive portion of the matching policy holder's
 52   |         | name.
 53   |         | example: max
 54   |         | dob?:
 55   |           | type: date-only
 56   |           | description: The exact date of birth of the matching policy holder.
 57   |           | example: 2006-05-04
  
```

Others Parameters Security

uses baseUriParameters securedBy

schemas

types

traits

resourceTypes

annotationTypes

securitySchemes

/policyHolders : get

Mocking service:

Try it

Search for policy holders matching the query parameters.

Request

GET [https://mocksvc.mulesoft.com/mocks/336ea275-b234-493a-aadb-2036922c7c7f/\(version\)/policyHolders](https://mocksvc.mulesoft.com/mocks/336ea275-b234-493a-aadb-2036922c7c7f/(version)/policyHolders)

Parameters

Properties

Path parameters

version string Possible values: v1 (required) (enum)

Query parameters

name string A case-insensitive portion of the matching policy holder's name.

Example value: max

dob date- The exact date of birth of the only matching policy holder.

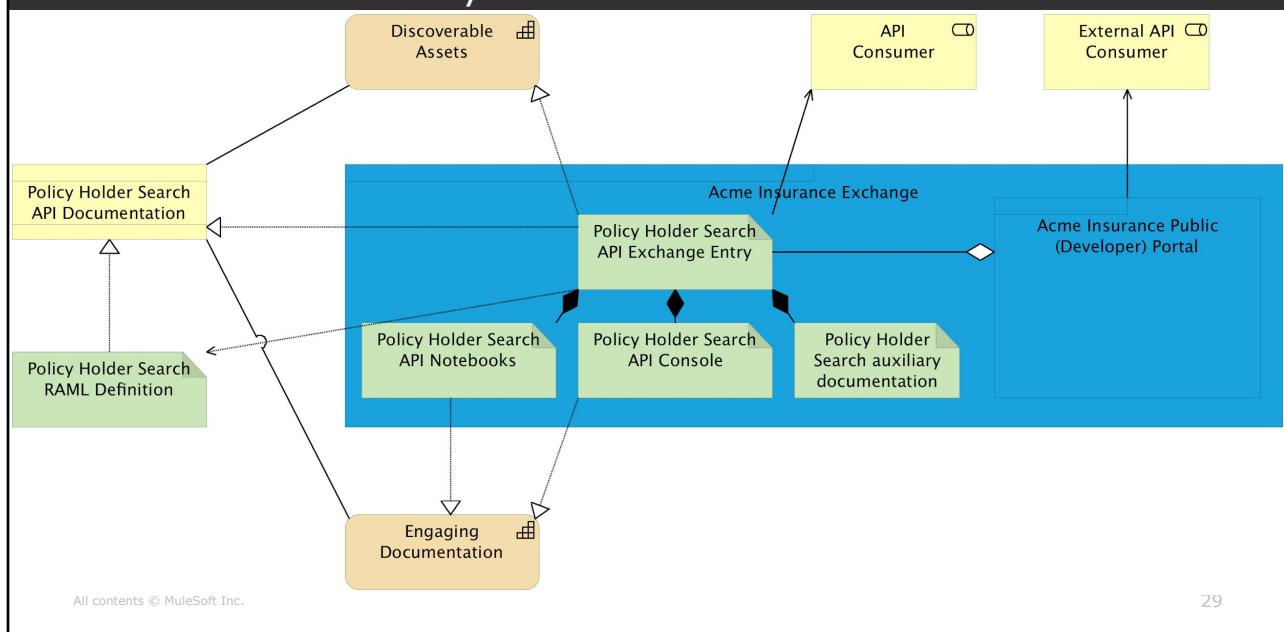
Example value: 2006-05-04

Response

All contents ©

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Creating engaging and discoverable documentation and assets for "Policy Holder Search PAPI"



Publishing an Exchange entry for "Policy Holder Search PAPI"



The screenshot shows the published exchange entry for the "Policy Holder Search PAPI".

Left sidebar (Assets list):

- Assets list
- Policy Holder Search PAPI
- On Call
- Onboarding
- API notebook
- API implementations
- Runbook
- API summary

 - > Types
 - Resources
 - /policyHolders
 - GET**

- API instances

Exchange Entry Overview:

- Policy Holder Search PAPI** (v1)
- Rating: ★★★★☆ (1 review)
- API summary**
 - Version: v1
 - Supported media type: application/json
 - Supported protocols: HTTP
 - Searches for policy holders across all personal lines of business.
- API base URI**: <http://ans-policyholdersearch-papi.cloudhub.io/{version}>
- API resources**
 - [/policyHolders](#): Policy holders of any policy of a personal LoB, such that the policy holders are people.
- Reviews**

Right sidebar (Overview):

- Type: REST API
- Created By: AnyInsurance Owner
- Published On: Jan 11, 2018
- Visibility: Public

Asset versions for v1

Version	Instances
1.0.3	Mocking Service Staging - v1:7483787
1.0.2	⋮
1.0.1	⋮

Exchange auto-generates a REST Connector



Exchange

Assets list

PAGES

Home

API notebook

API implementations

Runbook

Dev onboarding

On call

SPECIFICATION

Summary

Endpoints

/policyHolders

Policy Holder Search PAPI | v1 Public

★★★☆☆ (2 reviews) Rate and review

Add description ↗

API Clients

- Connector

API Admin

- Staging, Production

Architecture

Policy Holder Search API

Policy Holder Search

Share Download Edit

As RAML
As Mule 3 connector
As Mule 4 connector

Created by AnyInsurance Owner

Published on Jan 11, 2018

Visibility Public

Asset versions for v1

Version	Instances
1.0.3	Mocking Service Staging - v1:7483787
1.0.2	
1.0.1	

Understanding the API Console for "Policy Holder Search PAPI" (Design Center, Exchange, Studio)



Assets list

Policy Holder Search PAPI

On Call

Onboarding

API notebook

API implementations

Runbook

API summary

> Types

✓ Resources

✓ /policyHolders

GET

API instances

Policy Holder Search PAPI | v1

★★★☆☆ (1 review)

/policyHolders : get

Search for policy holders matching the query parameters.

Request

GET <http://ans-policyholdersearch-papi.cloudhub.io/{version}/policyHolders>

Parameters

Parameter	Type	Description
Path parameters		
version (required)	string (enum)	Possible values: v1

Query parameters

name	Example: max
name	Example: max
dob	dd/mm/yyyy

Send

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Including an API Notebook for "Policy Holder Search PAPI"



The screenshot shows a left sidebar with navigation options like 'Assets list', 'Policy Holder Search PAPI', 'On Call', 'Onboarding', 'API notebook' (which is selected), 'API implementations', 'Runbook', '+ Add new page', 'API summary', '+ Add terms and conditions', and 'API instances'. The main area has a title 'Policy Holder Search PAPI' with a green house icon. It contains an 'API notebook' section with a toolbar (Bold, Italic, etc.) and a 'Delete Page' button. Below is a code snippet for creating a client handle:

```
API.createClient('client', '42d8fc5a-b6f4-4f3a-a583-498debc7dba3', 'policy-holder-search')
```

Buttons for 'Play' and 'Markdown' are shown. Further down, there's a section for retrieving policy holders without search criteria:

```
var body = client.policyHolders.get(null, null).body;
```

Another 'Play' button is present. Finally, a section for printing retrieved policy holders shows the output:

```
"Found these policy holders: " + body;
```

Buttons for 'Discard changes' and 'Save as draft' are at the bottom right. The page number '33' is in the bottom right corner.

Publishing "Policy Holder Search PAPI" to Acme Insurance's Public (Developer) Portal



The screenshot shows the Acme Insurance public developer portal. At the top, there's a navigation bar with 'Home' and 'My applications'. The main area has a dark blue header with the text 'Acme Insurance public developer portal' and a sub-header 'Build your application network faster! Get started with powerful tools, intuitive interface, and best in class documentation experience.' Below this is a search bar and a sidebar with 'All types' dropdown and a search input. A REST API card for 'Policy Holder Search PAPI' is shown, featuring a green house icon, a 5-star rating, and the text 'AnyInsurance Owner'.

A modal window titled 'Share Policy Holder Search PAPI' is open on the right. It includes fields for 'Search for a user' (with placeholder 'Viewer'), a 'Viewer' role selection, and an 'Add' button. It also shows a user entry 'AO AnyInsurance Owner (aryinsurance-owner)' with a 'Admin' role and a 'Cancel' and 'Share' button. The background shows a sidebar with 'Overview', 'Type', 'Created By', 'Published On', 'Visibility', 'Asset v', 'Version', and '1.0.3'.

The page number '34' is in the bottom right corner.

Publishing "Policy Holder Search PAPI" to Acme Insurance's Public (Developer) Portal



← Assets list

Policy Holder Search PAPI

On Call

Onboarding

API notebook

API implementations

Runbook

API summary

> Types

▼ Resources

▼ /policyHolders

GET

All content API instances

API summary

Version: v1

Supported media type: application/json

Supported protocols: HTTP

Searches for policy holders across all personal lines of business.

API base URI

<http://ans-policyholdersearch-papi.cloudhub.io/{version}>

API resources

[/policyHolders](#)

Policy holders of any policy of a personal LoB, such that the policy holders are people.

Reviews

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Repeat for all APIs for the "Create quote for aggregators" feature



≡ | ✎ Exchange

Acme Insurance

REST APIs ▾

Search

New

All

MuleSoft

Acme Insurance

My applications

Public Portal

Showing results for REST APIs.

Policy Options Ranking PAPI

AnySurance Owner

Policy Options Retrieval SAPI

AnySurance Owner

Aggregator Quote Creation EAPI

AnySurance Owner

Policy Holder Search PAPI

AnySurance Owner

Home Policy Holder Search SAPI

AnySurance Owner

Motor Policy Holder Search SAPI

AnySurance Owner

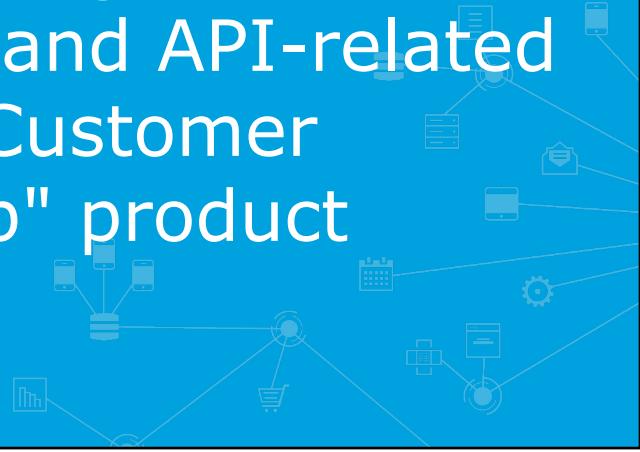
Mobile Policy Holder Summary EAPI

AnySurance Owner

Motor Quote Creation Addon Bus SAPI

AnySurance Owner

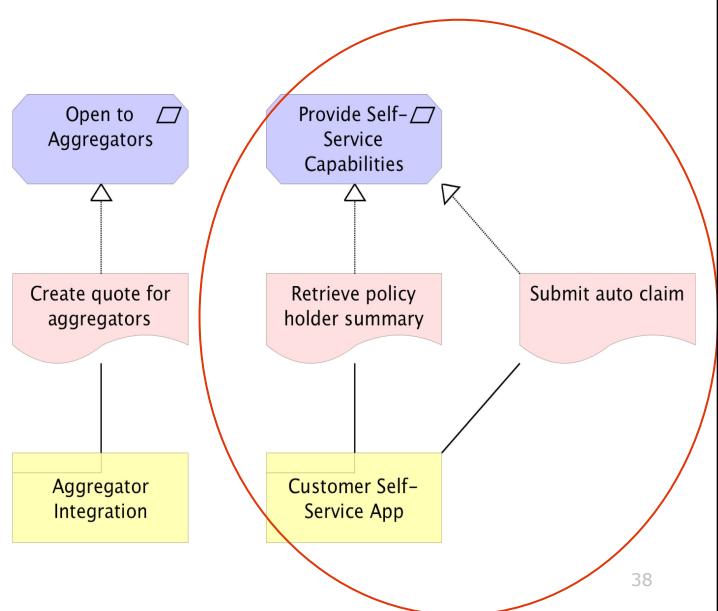
Identifying, reusing and publishing APIs and API-related assets for the "Customer Self-Service App" product



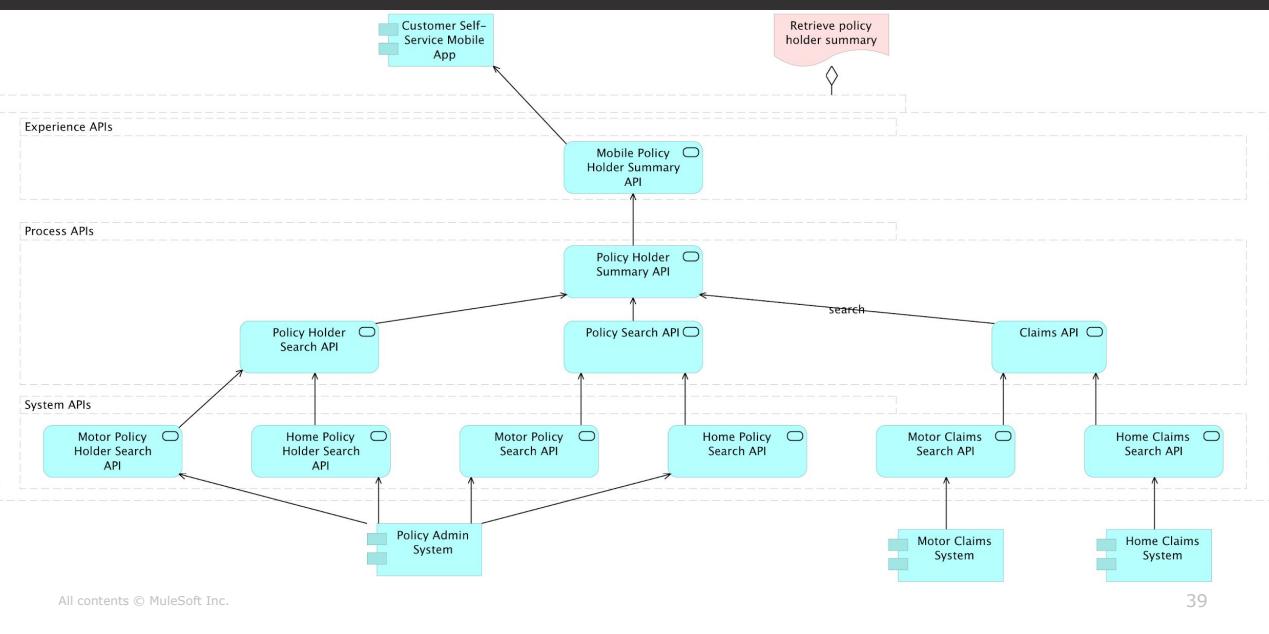
Growing the application network for the "Customer Self-Service App" product



- Only consider functional requirements for now
- **Second API-led connectivity project at Acme Insurance**
 - Grow nascent application network
 - **C4E** essential for **cross-LoB** activities



APIs for the "Retrieve policy holder summary" feature in all tiers



APIs for the "Retrieve policy holder summary" feature in all tiers

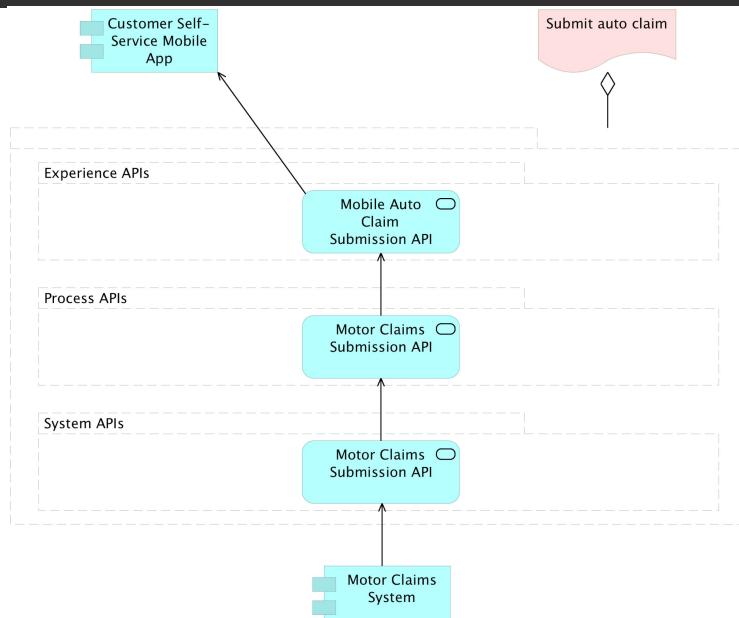
- **"Mobile Policy Holder Summary EAPI":**
 - (policy holder identifier) → (policy holder status summary)
- **"Policy Holder Summary PAPI":**
 - (policy holder identifier) → (policy holder status summary)
- **"Policy Search PAPI":**
 - (policy properties) → (matching policies)
- **"Claims PAPI":**
 - search: (claim properties) → (matching claims)

APIs for the "Retrieve policy holder summary" feature in all tiers



- "Motor Policy Search SAPI":
 - (motor policy properties) → (matching motor policies)
- "Home Policy Search SAPI":
 - (home policy properties) → (matching home policies)
- "Motor Claims Search SAPI":
 - (claim properties) → (matching motor claims)
- "Home Claims Search SAPI":
 - (claim properties) → (matching home claims)

APIs for the "Submit auto claim" feature in all tiers



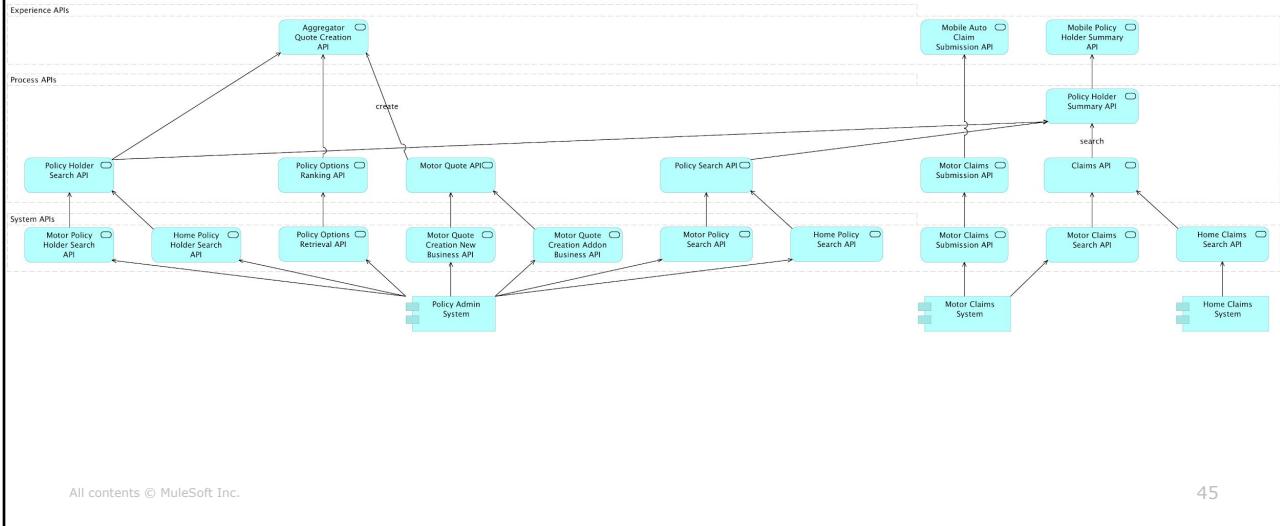
- "Mobile Auto Claim Submission EAPI":
 - (claim description) → (acknowledgement)
- "Motor Claims Submission PAPI":
 - (claim description) → (acknowledgement)
- "Motor Claims Submission SAPI":
 - (claim description) → (acknowledgement)

Publishing APIs and API-related assets

Acme Insurance's application network now has assets for all known APIs:

- **API specs** in the form of **RAML definitions**
- Entries in Acme Insurance's **Exchange**
 - Include **API Console**, **API Notebook**
 - Pointing to the API's **instances/endpoints**: so far only **mocking service**
- Acme Insurance **Public (Developer) Portal** for public APIs
- **No NFRs** have been addressed
- **No API implementations** and **no API clients** have been developed

Publishing APIs and API-related assets



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Publishing APIs and API-related assets



The screenshot shows the MuleSoft Exchange interface for the Acme Insurance application. The sidebar navigation includes:

- All
- MuleSoft
- Acme Insurance** (selected)
- My applications
- Public Portal

The main content area displays the REST APIs for Acme Insurance:

REST API	Rating	Owner
Policy Options Ranking PAPI	★★★★★	AnySurance Owner
Policy Options Retrieval SAPI	★★★★★	AnySurance Owner
Aggregator Quote Creation EAPI	★★★★★	AnySurance Owner
Policy Holder Search PAPI	★★★★★	AnySurance Owner
Home Policy Holder Search SAPI	★★★★★	AnySurance Owner
Motor Policy Holder Search SAPI	★★★★★	AnySurance Owner
Mobile Policy Holder Summary EAPI	★★★★★	AnySurance Owner
Motor Quote Creation Addon Bus SAPI	★★★★★	AnySurance Owner

Building developer communities around APIs with Anypoint API Community Manager



API Community Manager



- **Exchange** and Public Developer Portals have limitations
 - Not general purpose **CMSs**
 - Limited visual **customization**
 - No discussion forums or other advanced interaction channels with API consumers
- **API Community Manager**
 - Reuses information available in Anypoint Platform and **Exchange**
 - Provides advanced **presentation and interaction** capabilities

API Community Manager



Exchange API portals

- Auto-generated
- Searchable catalog
- Lightweight branding

API Community Manager

- Branded, personalized experiences
- Forums, blogs and events
- Support case management



Exchange services



All co

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API Community Manager



- Build and operate **API consumer communities**
 - Internal and external developers (partners)
- **Customization**, branding, marketing, and engagement
- **Surface** selected APIs cataloged in Exchange
- Manage **API clients**, access credentials, and consumption metrics
- Implemented on **Salesforce Community Cloud**
 - Invokes Anypoint **Platform APIs** to retrieve API-related information
 - Limitless customization through **Salesforce Community Builder**
 - Extensive **dashboards and reports** about how API consumers interact with assets in API Community Manager

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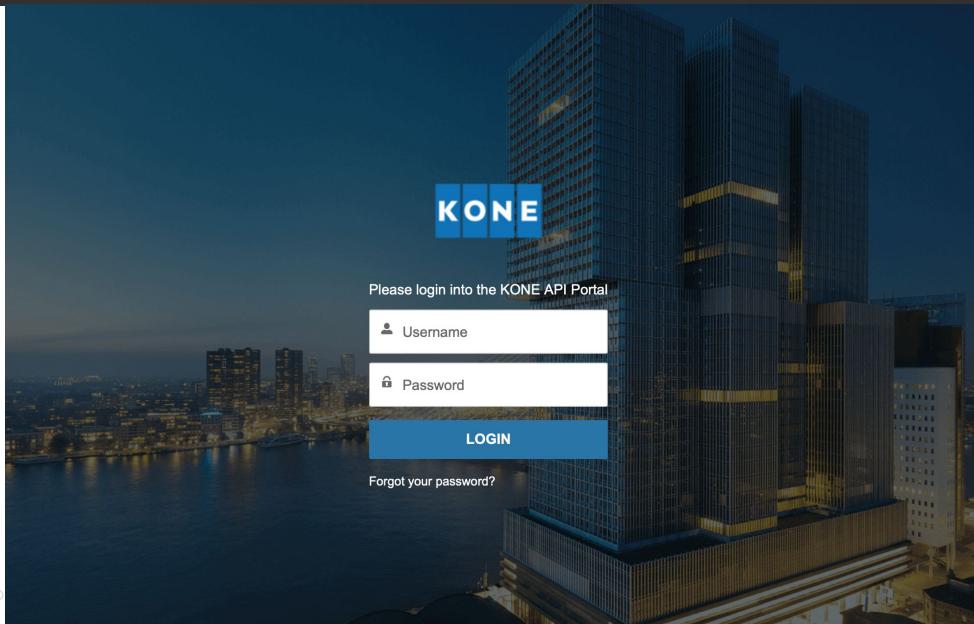
50

API Community Manager branding and customization



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API Community Manager content sources



The future of banking APIs with HSBC

Business API Insights > I want to learn about API products

Develop > I want to build API Solutions

Our API Solutions

Welcome to HSBC's Developer Portal. Here you can learn about our secure API capabilities and solutions, and find inspiration for your business allowing you to work simpler, better and faster.

News and Announcements

Account Information Open Banking API v2.5 released

Case Study - Helping Hands

Coming soon: Fireide Chat with HSBC Digital Products Leadership

Choose a Solution That Meets Your Needs

Present customer data > Create custom user experiences with your customer financial information

Offer products and services > Extend your product offerings with HSBC wide range of financial products and services

Trade internationally > Foreign Exchange and Trade Services

Ready to get started?

API Documentation and Sample Code available for each API

It's really straightforward that the only question will be, 'what will you build?'

Offer products and services

Expand your product offerings with HSBC's wide range of financial products and services

Fulfill end-to-end journeys in your apps

With HSBC APIs you can provide a seamless experience to your customers, leveraging HSBC's tailored financial products and services right at the point of need.

Filter by Keywords: Region: All, Europe, Americas, Asia

Domain: All, Americas, Asia, Europe

Segment: All

Saving Account Opening API

Accept PII data and process applications for HSBC Saving Account. Can be used in-line with other services such as credit card application or checking account opening.

Personal Loans API

Analyzes key financial assets held or registered within the customer's account, including credit history, and provides pre-approval for a personal loan of a specific amount.

Credit Card Applications API

Accept PII data and process applications for HSBC Credit Cards. Can be used in-line with other services such as saving or checking account opening.

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API Community Manager API console



Mortgage Eligibility API

Analyzes key financial assets held or registered within the customer's account, including credit history, and provides mortgage pre-approval for a specific amount.

Home

Mortgage Eligibility API

Overview



Get Started

Introduction

Version: 1

Use cases

Analyzes key financial assets held or registered within the customer's account, including credit history, and provides mortgage pre-approval for a specific amount.

How-to: high-volume

<https://mortgage-eligibility.api.hsbc.com>



How-to: async call

Securing customer information

Supported protocols

HTTPS HTTP

Performance tuning

Troubleshooting

API endpoints

Summary

[/customer](#)

Endpoints

[/customer/{cid}](#)

All contents

[/customer/{cid}/application](#)

GET

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Try this API

Select API Instance

Mocking Service

Generate SDK

Select API Instance



API Community Manager API client management



HSBC Home News Get Started API Catalog Community Support

Ready to get started?

Our API platform lets you easily access financial solutions and approved customer data, and implement it seamlessly in your products and services. All documentation and sample code is available for each API.

It's really so straightforward that the only question will be, 'what will you build'?

1

2

3

4

Get Sandbox API key

Sign up and browse our API catalogue to assemble a suite of APIs for your digital experiences.

Client ID

d31d32af-cfe6-4562-9c66-44cc98c837fb

Client Secret

Download SDK and build

Discover our range of innovative resources that push boundaries and redefine what's possible.

Programming Language

JavaScript

Download

Promote API key to production

Get straight to work in a production environment, with live testing within your app or website.

Launch

Move straight into production and connect your customers with unique digital experiences.

All contents

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API Community Manager admin



The screenshot shows the API Community Manager admin interface. At the top, there's a navigation bar with the HSBC logo, a search bar, and user profile icons. Below the header, a blue banner displays the word "Community". The main content area has a search bar with "hsbc" typed in. A navigation bar below the search bar includes links for "Manage APIs", "Manage Members", "Manage CMS Content", "Manage Forums", "Dashboards", "Community Administration", "Community Builder", and "Open Community". A "Filter APIs" input field is also present. The main table lists five APIs under the heading "APIs in this Community": Credit Card Applications API, Current Account Overdraft API, Investment Product Opening API, Mortgage Eligibility API, and Personal Loans API. Each row includes columns for Version (1), Visibility (Everyone), Description, Business Group (HSBC CMB), and "Remove" and "Edit" buttons. On the left side, there's a sidebar with "All communities" and a page number "55".

Salesforce Community Builder for API communities



The screenshot shows the Salesforce Community Builder for API communities interface. At the top, there's a navigation bar with the "API Catalog" tab selected. The main content area features a search bar with "Find a page..." and a sidebar with various page templates like "Blank", "Create Record", "Error", etc. The main area displays a grid of API cards. The first card is "Mortgage Eligibility API" (Europe). The second card is "Current Account Overdraft API" (Europe). The third card is "Investment Product Opening API" (Americas). The fourth card is "Saving Account Opening API" (Americas). Each card has a "API Details" button. On the left side, there's a sidebar with "All communities" and a page number "56".

Summary



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- Strategic initiatives map to "**Aggregator Integration**" product and "**Customer Self-Service App**"
 - **3 Experience APIs, 7 Process APIs and 10 System APIs**
- 1 Process API and 2 System APIs **reused**
- Used **Design Center** to sketch and simulate **API specs** in the form of **RAML definitions** for each API
- Created and published **Exchange** entries with **API Console** and **API Notebook**
- APIs from Exchange can be exposed in **API Community Manager**
 - Visually more **compelling** and more **interactive** experience than through Exchange and Exchange Portals alone