



Anypoint Platform Architecture: Application Networks

Module 4

Identifying, Reusing and Publishing APIs



Objectives

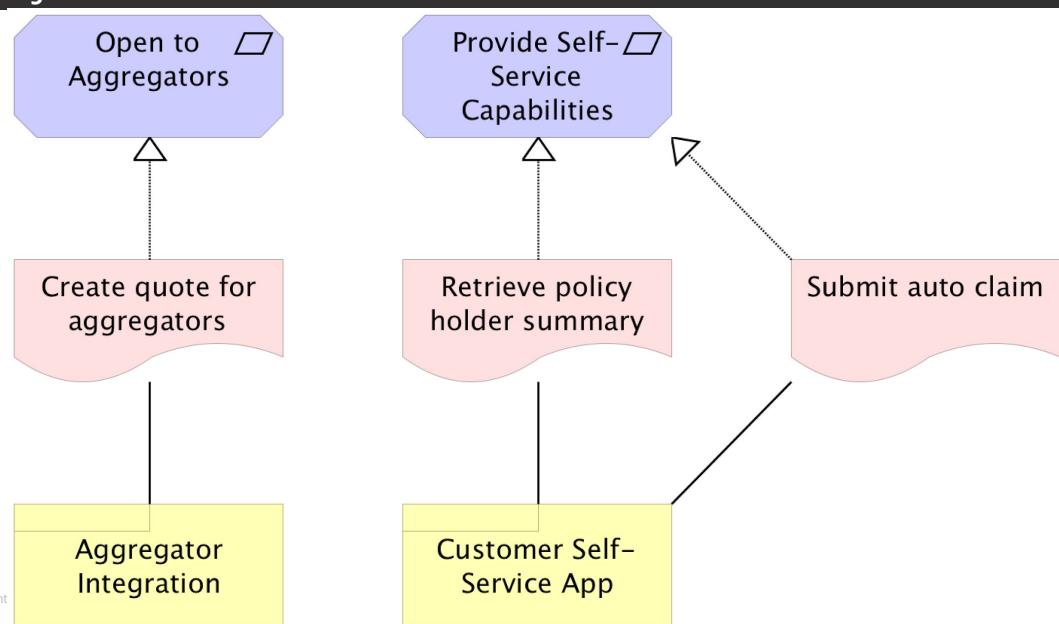


- Map Acme Insurance's planned **strategic initiatives** to products and projects
- **Identify APIs** needed to implement these products
- Assign each API to one of the **three tiers** of API-led connectivity
- Reason about **composition and collaboration** of APIs
- **Reuse APIs** wherever possible
- **Publish APIs and related assets** for reuse

Productizing Acme Insurance's strategic initiatives



Translating strategic initiatives into products,
projects and features



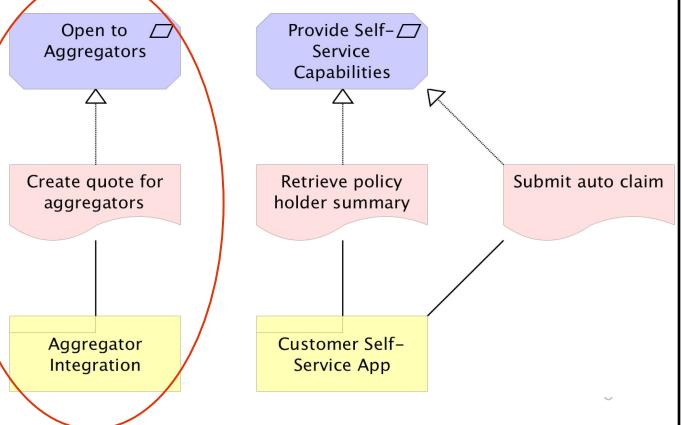
Identifying APIs for the "Aggregator Integration" product



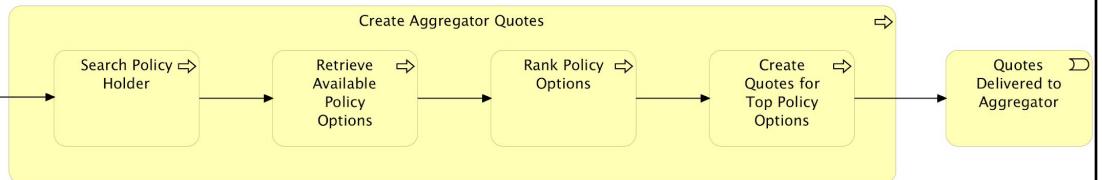
Towards an application network



- "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**



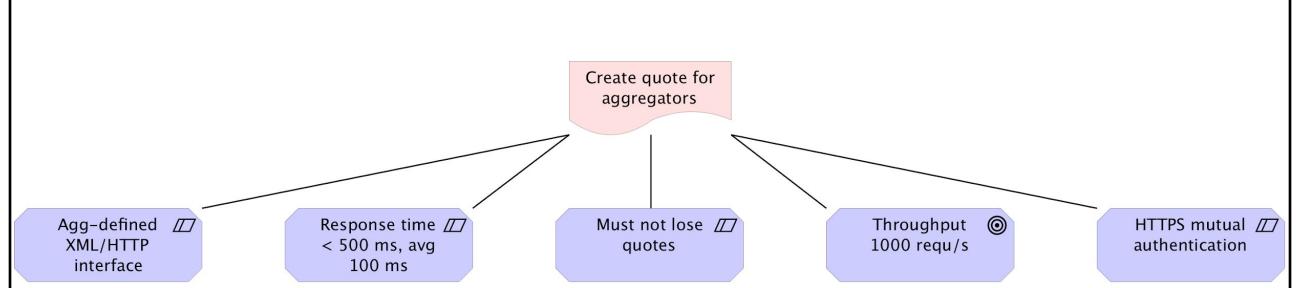
"Create quote for aggregators" business process view



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Looking ahead to NFRs for "Create quote for aggregators"



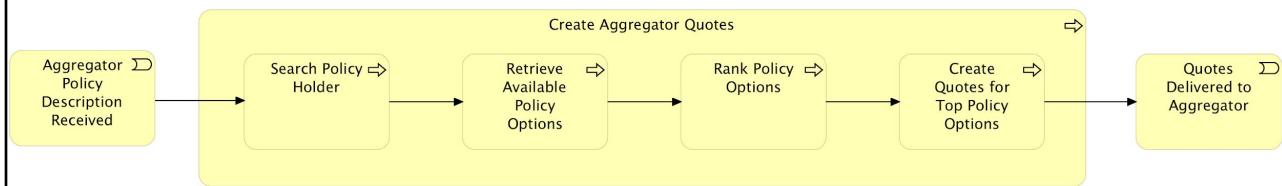
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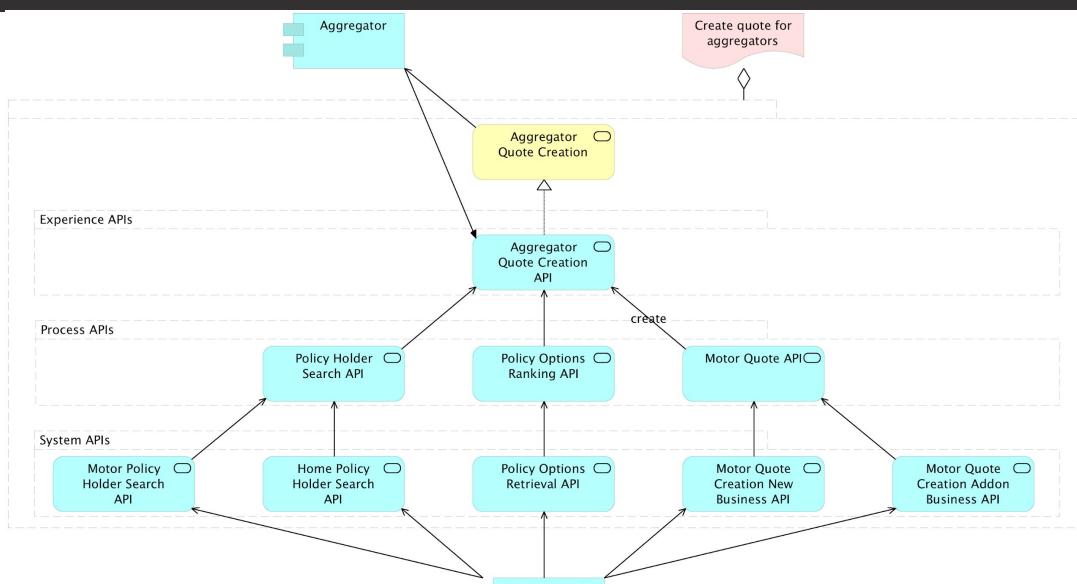
Exercise: Identify APIs for the "Create quote for aggregators" feature



- 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:

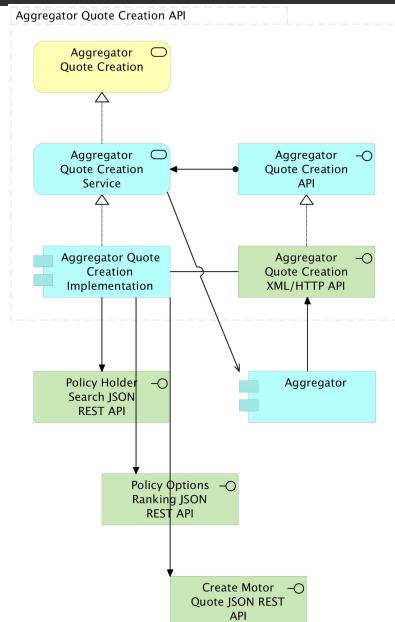
- **Compare and contrast** coarse-grained and fine-grained APIs and API implementations

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

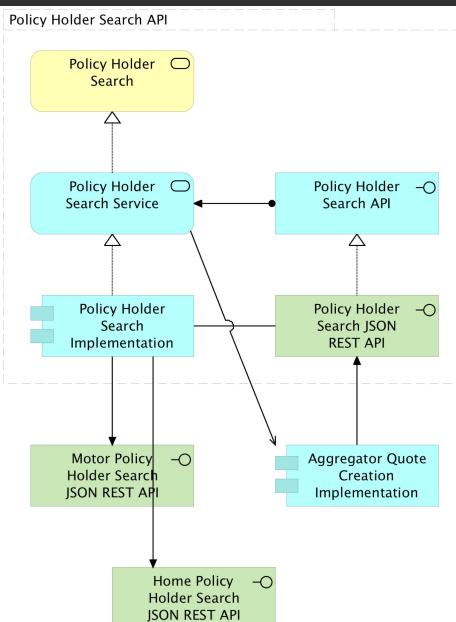
Aggregator Quote Creation EAPI



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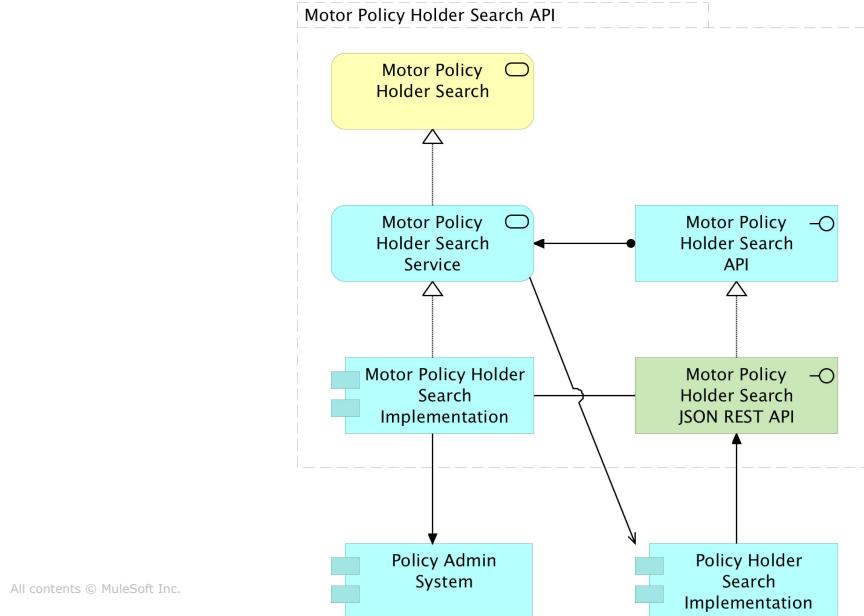
Policy Holder Search PAPI



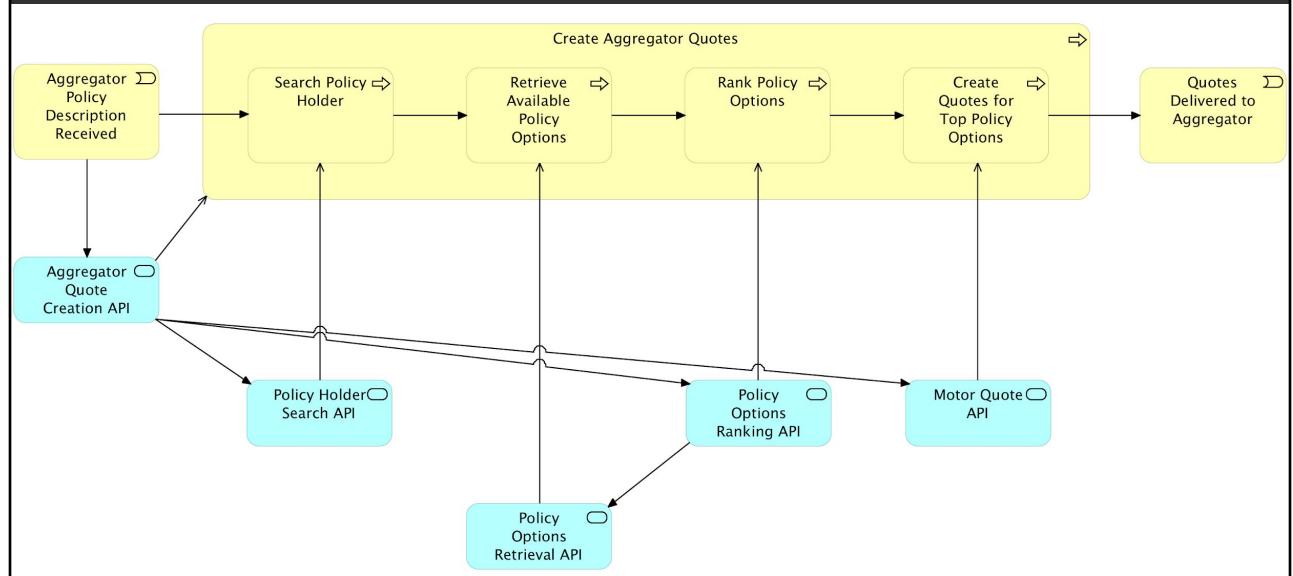
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Motor Policy Holder Search SAPI



API-business alignment



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



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

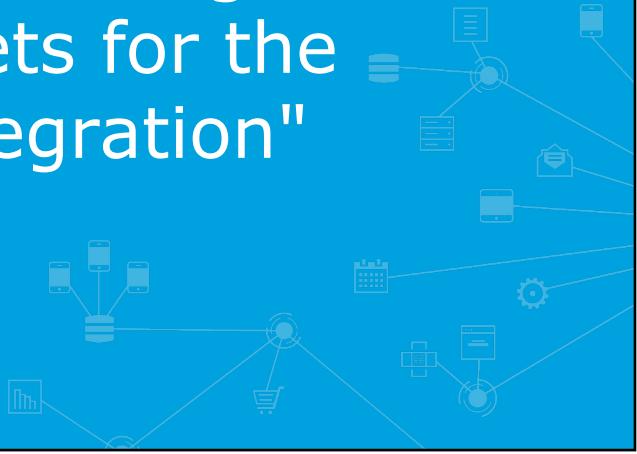
1. Analyze the APIs identified so far with respect to their dependency on the data format exchanged with the Aggregator
2. Identify new APIs and refine existing APIs to maximize reuse when other Aggregators will need to be supported in the future
3. Describe as clearly as possible which elements of the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



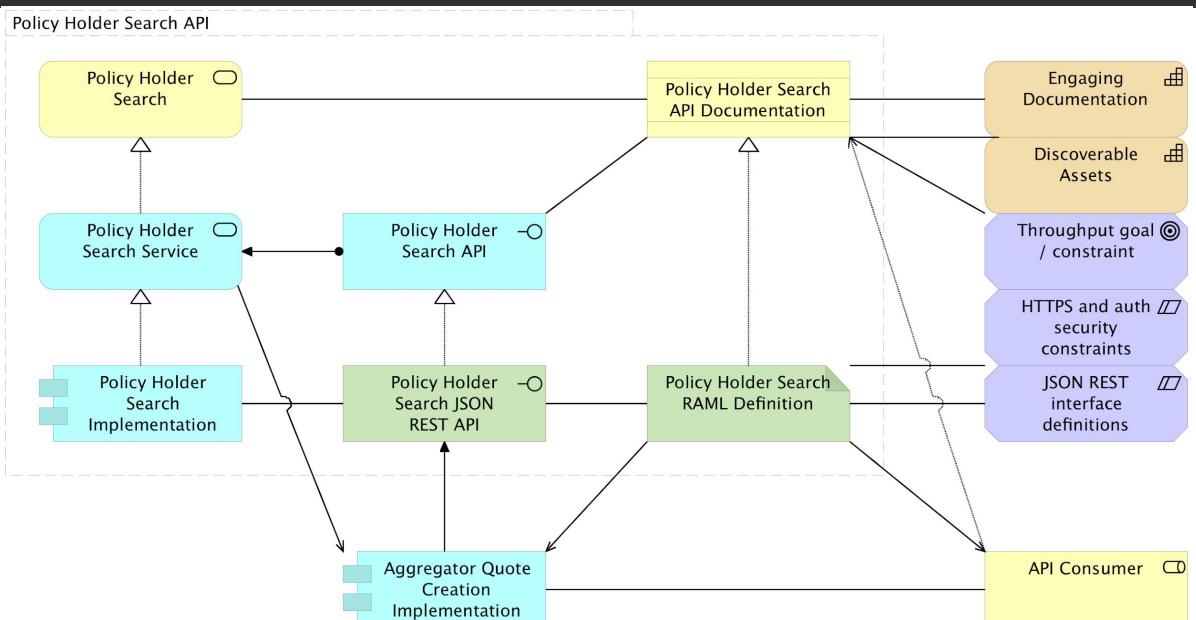
Steps to reusing API-related assets



- 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 RAML definition **in Design Center, export to Exchange**
 - **Version** states **readiness**: v0 for RAML definition, 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

"Policy Holder Search PAPI" documentation



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



The screenshot shows the MuleSoft Design Center interface. On the left, the RAML file `policy-holder-search-papi.raml` is displayed with code like:

```

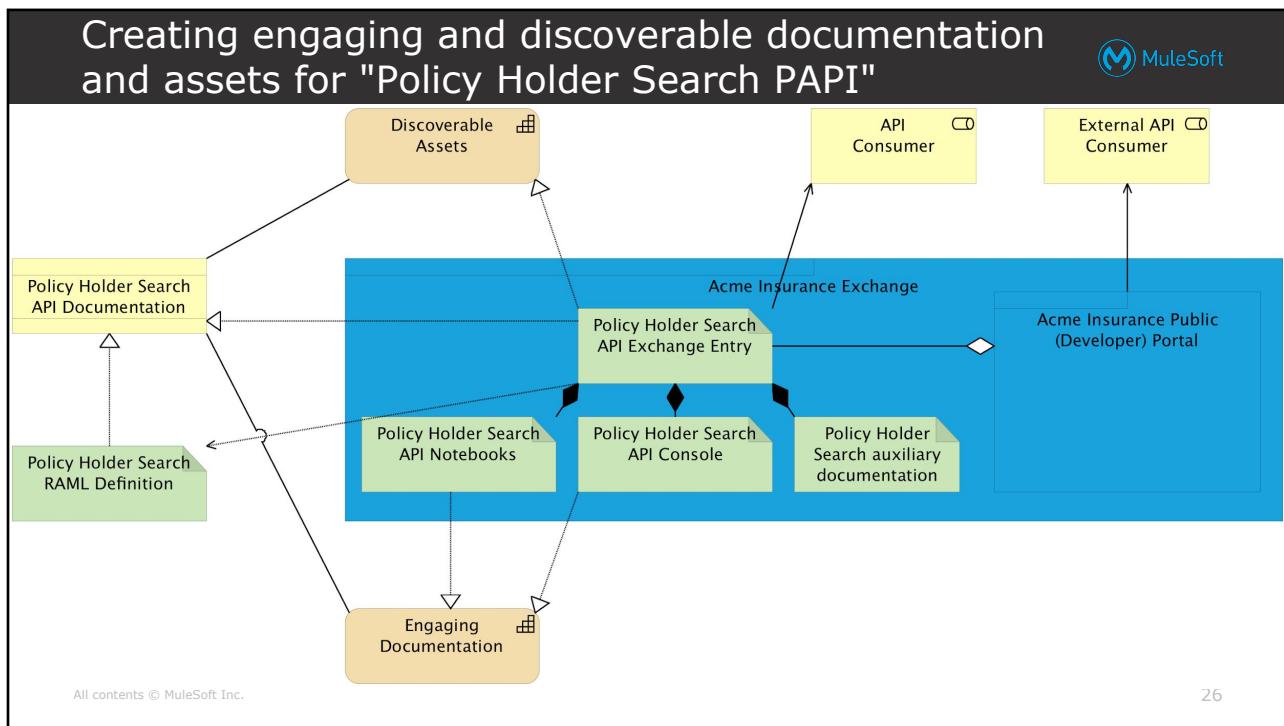
41   name: Max The Mule
42   dob: 2006-05-04
43
44   type: Person
45   properties:
46     customerSince?: date-only
47     lobs: Lob[]
48   examples:
49     auto-minimal:
50       name: Max The Mule
51       lobs: [ PersonalMotor ]
52     full:
53       name: Max The Mule
54       dob: 2006-05-04
55       customerSince: 2006-05-05
56       lobs: [ PersonalMotor, Home ]
57
58   /policyHolders:
59     description: |
60       Policy holders of any policy of a personal LoB, such that the policy holders are people.
61     get:
62       description: Search for policy holders matching the query parameters.
63       queryParameters:
64         name?:
65           type: string
66           description: A case-insensitive portion of the matching policy holder's name.
67           example: max
68         dob?:
69           type: date-only
70           description: The exact date of birth of the matching policy holder.
71           example: 2006-05-04

```

On the right, the API Mocking service interface for the endpoint `/policyHolders : get` is shown. It includes fields for Request, Parameters, Properties, Path parameters, Query parameters, and Response. The Response section shows a sample response with fields like `version`, `name`, and `dob`.

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Publishing an Exchange entry for "Policy Holder Search PAPI"



← 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)

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

Share Download Edit ...

Type REST API

Created By AO 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



Acme Insurance

All types ▾



policy holder search papi

Showing results for "policy holder search papi". [Save this search](#)



★★★★★



Policy Holder Search PAPI
Connector

AnyInsurance Owner



★★★★☆



Policy Holder Search PAPI

AnyInsurance Owner

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



The screenshot shows the MuleSoft API Console interface. On the left, a sidebar lists various assets like 'Assets list', 'Policy Holder Search PAPI', 'On Call', etc. The main area displays the 'Policy Holder Search PAPI' details, including its icon, name, version (v1), and a 4-star rating from 1 review. Below this is the endpoint '/policyHolders : get' with a description: 'Search for policy holders matching the query parameters.' A 'Request' section shows a GET request to `http://ans-policyholdersearch-papi.cloudhub.io/{version}/policyHolders`. The 'Parameters' section includes a table for path, query, and header parameters. To the right, a 'Mocking Service' interface is shown for 'Mocking Service' (version v1). It includes sections for 'URI parameters' (with 'name' and 'version' dropdowns) and 'Query parameters' (with 'name' and 'dob' dropdowns). A 'Send' button and a count of 29 are also present.

Including an API Notebook for "Policy Holder Search PAPI"



The screenshot shows the MuleSoft API Studio interface. The left sidebar includes 'Assets list', 'Policy Holder Search PAPI', 'On Call', 'API notebook' (which is selected), 'API implementations', 'Runbook', '+ Add new page', 'API summary', '+ Add terms and conditions', and 'API instances'. The main area is titled 'Policy Holder Search PAPI' (v1). It contains an 'API notebook' section with tabs for 'Delete Page', 'Markdown', and 'Visual'. Below this are code snippets for creating a client handle and retrieving policy holders. At the bottom, there are buttons for 'Discard changes', 'Save as draft', and a page number '30'.

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



The screenshot shows the Acme Insurance public developer portal interface. On the left, there is a sidebar with a user icon, 'Home' (selected), and 'My applications'. The main area has a title 'Acme Insurance public developer portal' and a subtitle 'Build your application network faster! Get started with powerful tools, intuitive interface and best in class documentation experience.' Below this is a search bar ('All types' dropdown, 'Search' input) and a list of APIs. One API is highlighted: 'Policy Holder Search PAPI' (REST API, 5 stars, AnyInsurance Owner). A modal dialog is open over the list, titled 'Share Policy Holder Search PAPI'. It contains fields for 'Search for a user' (Viewer selected), 'AO AnyInsurance Owner (aryinsurance-owner)', and 'Add' (Admin selected). Buttons for 'Cancel' and 'Share' are at the bottom right. The background shows other API entries like 'Onboarding' and 'Runbook'.

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



The screenshot shows the MuleSoft Anypoint Platform API details page for the 'Policy Holder Search PAPI'. The left sidebar includes 'Assets list', 'Policy Holder Search PAPI' (selected), 'On Call', 'Onboarding', 'API notebook', 'API implementations', 'Runbook', 'API summary' (selected), 'Types' (under API summary), 'Resources' (under API summary), '/policyHolders' (under Resources), and 'GET' (under /policyHolders). The main content area shows the API details: title 'Policy Holder Search PAPI | v1', rating '★★★★★ (1 review)', 'API Spec' button, and 'Request access' button. The 'API summary' section includes 'Version: v1', 'Supported media type: application/json', 'Supported protocols: HTTP', and a description 'Searches for policy holders across all personal lines of business.'. The 'API base URI' is listed as 'http://ans-policyholdersearch-papi.cloudhub.io/{version}'. The 'API resources' section lists '/policyHolders' with a description 'Policy holders of any policy of a personal LoB, such that the policy holders are people.' The 'Reviews' section shows a single review with a star rating of 5. A 'Reviews' link is also present in the sidebar.

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



Exchange | Acme Insurance | ? | A0

All | MuleSoft | Acme Insurance | REST APIs | Search | New | More

Showing results for REST APIs.

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

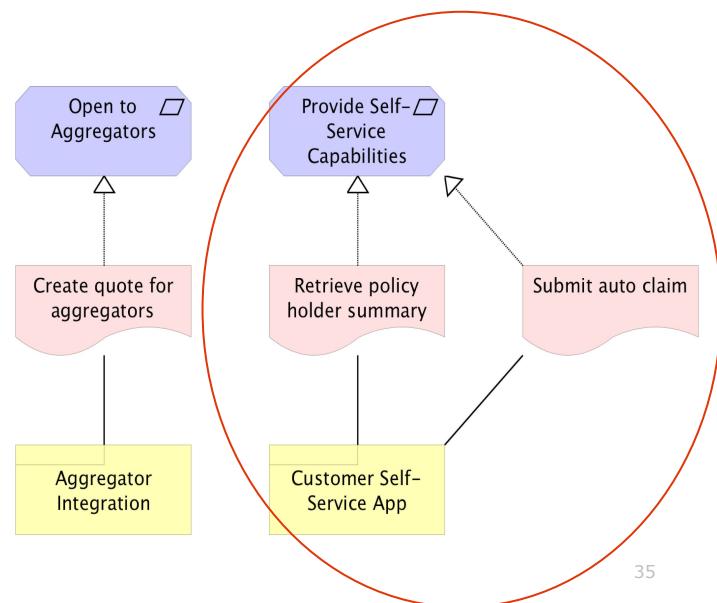
Identifying, reusing and publishing APIs and API-related assets for the "Customer Self-Service App" product



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



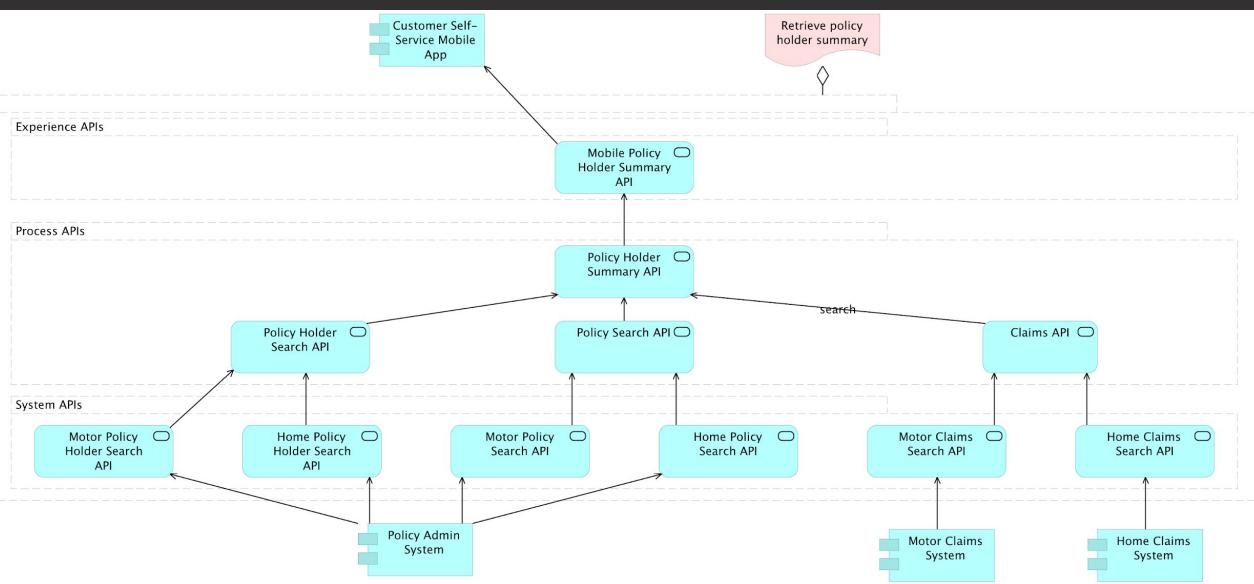
- Only consider functional requirements for now
- Second API-led connectivity project at Acme Insurance**
 - Grow nascent application network
 - C4E essential for **cross-LoB** activities



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



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



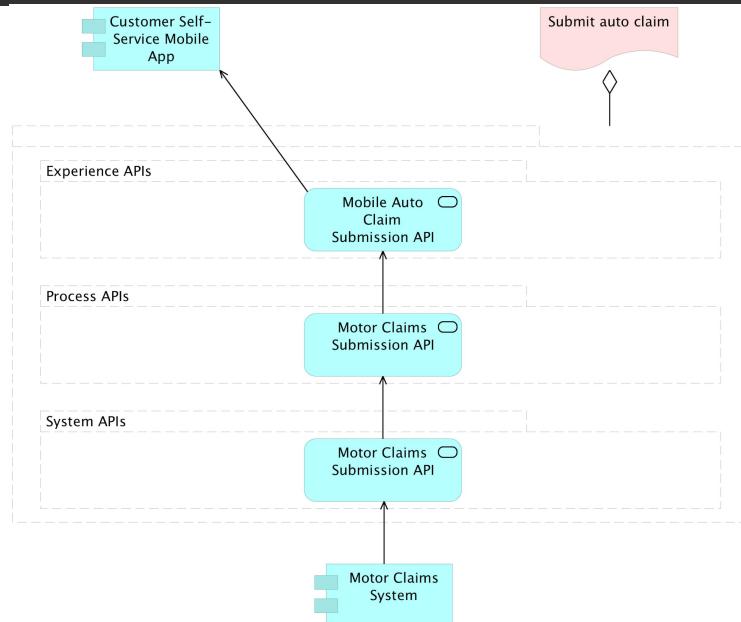
- "Mobile Policy Holder Summary EAPI":
 - (policy holder identifier) → (policy holder status summary)
- "Policy Holder Summary PAPI":
 - (policy holder identifier) → (policy holder status summary)
- "Policy Search PAPI":
 - (policy properties) → (matching policies)
- "Claims PAPI":
 - search: (claim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



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



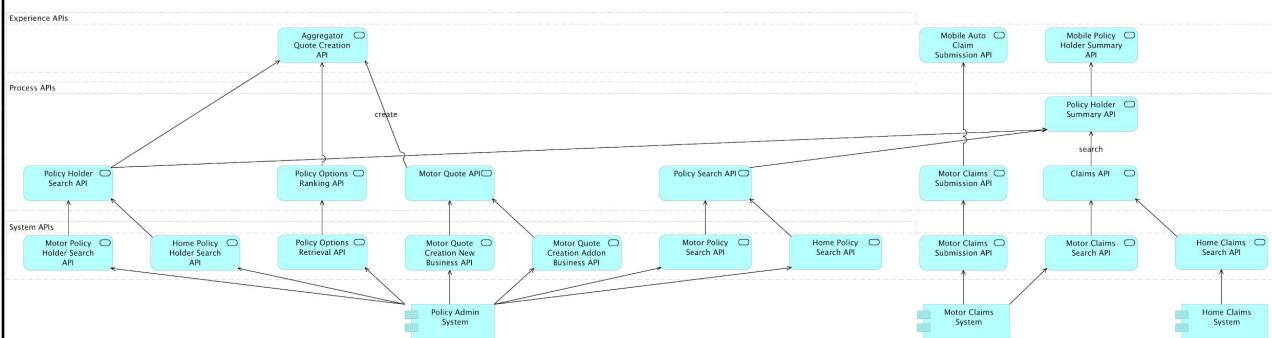
Acme Insurance's application network now has assets for all known APIs:

- **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

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Publishing APIs and API-related assets



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Publishing APIs and API-related assets



Exchange | Acme Insurance | ? | A0

All | MuleSoft | Acme Insurance | My applications | Public Portal

Acme Insurance

REST APIs | Search | New | ...

Showing results for REST APIs.

Icon	Name	Owner	Rating
	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	★★★★★
			★★★★★
			★★★★★
			★★★★★
			★★★★★

Summary



- 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 **RAML definitions** for each API
- Created and published **Exchange** entries with **API Console** and **API Notebook**