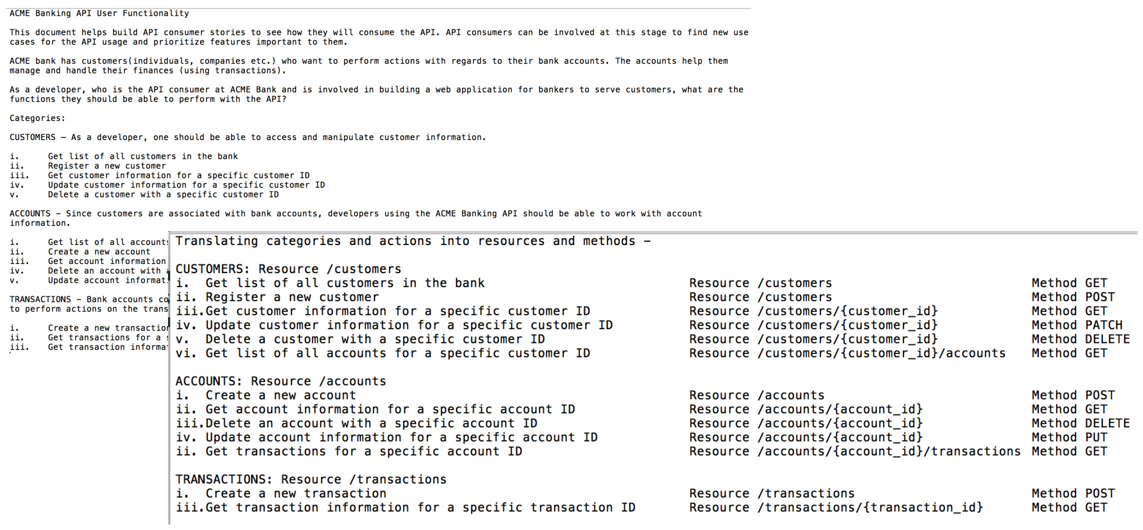
MuleSoft

Module 2: Translating Functional Requirements for APIs

Goal

MuleSoft



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ACME Banking API User Functionality

This document helps build API consumer stories to see how they will consume the API. API consumers can be involved at this stage to find new use
cases for the API usage and prioritize features important to them.

ACME bank has customers(individuals, companies etc.) who want to perform actions with regards to their bank accounts. The accounts help them
manage and handle their finances (using transactions).

As a developer, who is the API consumer at ACME Bank and is involved in building a web application for bankers to serve customers, what are the
functions they should be able to perform with the API?

Categories:

CUSTOMERS – As a developer, one should be able to access and manipulate customer information.

i.      Get list of all customers in the bank
ii.     Register a new customer
iii.    Get customer information for a specific customer ID
iv.     Update customer information for a specific customer ID
v.      Delete a customer with a specific customer ID

ACCOUNTS – Since customers are associated with bank accounts, developers using the ACME Banking API should be able to work with account
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i.      Get list of all account
ii.     Create a new account
iii.    Get account information
iv.     Delete an account with
v.      Update account informat

TRANSACTIONS – Bank accounts co
to perform actions on the trans

i.      Create a new transactio
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iii.    Get transaction informat
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Translating categories and actions into resources and methods –

CUSTOMERS: Resource /customers
i.  Get list of all customers in the bank                     Resource /customers                               Method GET
ii. Register a new customer                                   Resource /customers                               Method POST
iii.Get customer information for a specific customer ID       Resource /customers/{customer_id}                 Method GET
iv. Update customer information for a specific customer ID    Resource /customers/{customer_id}                 Method PATCH
v.  Delete a customer with a specific customer ID             Resource /customers/{customer_id}                 Method DELETE
vi. Get list of all accounts for a specific customer ID       Resource /customers/{customer_id}/accounts        Method GET

ACCOUNTS: Resource /accounts
i.  Create a new account                                      Resource /accounts                                Method POST
ii. Get account information for a specific account ID         Resource /accounts/{account_id}                   Method GET
iii.Delete an account with a specific account ID              Resource /accounts/{account_id}                   Method DELETE
iv. Update account information for a specific account ID      Resource /accounts/{account_id}                   Method PUT
ii. Get transactions for a specific account ID                Resource /accounts/{account_id}/transactions      Method GET

TRANSACTIONS: Resource /transactions
i.  Create a new transaction                                  Resource /transactions                            Method POST
iii.Get transaction information for a specific transaction ID Resource /transactions/{transaction_id}           Method GET
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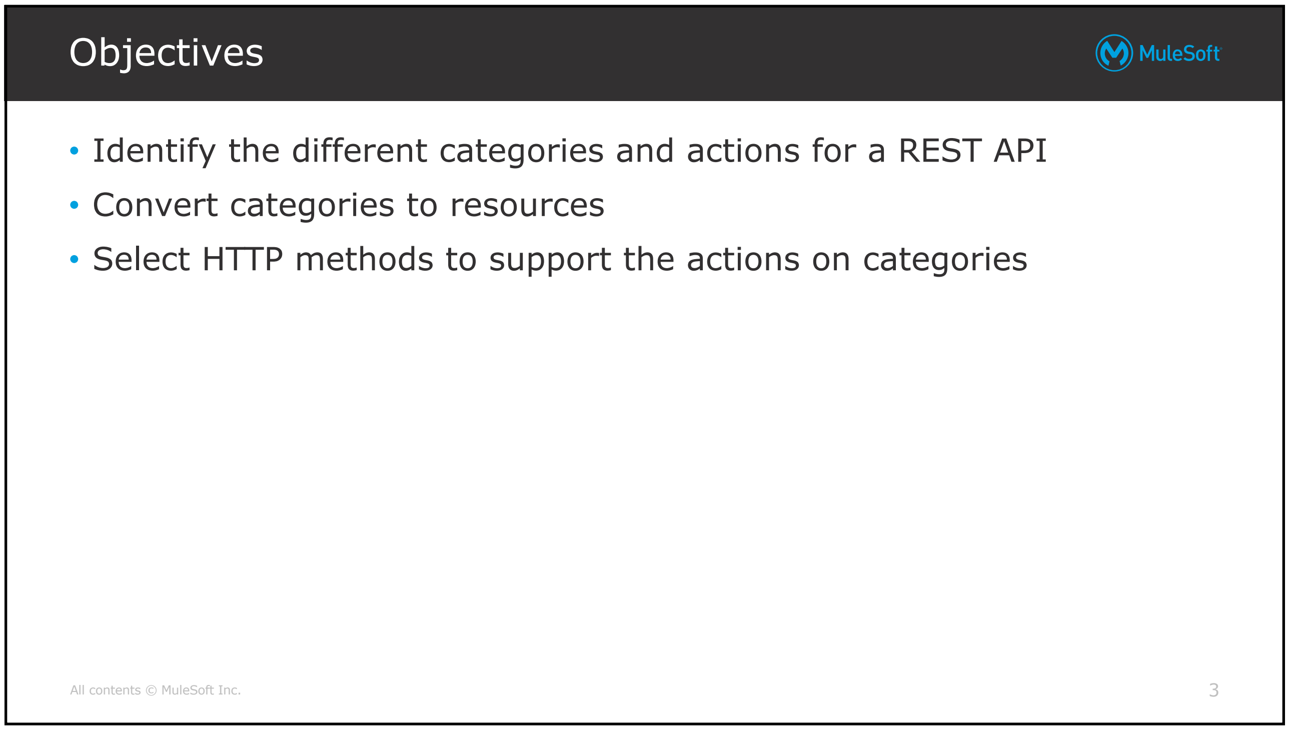
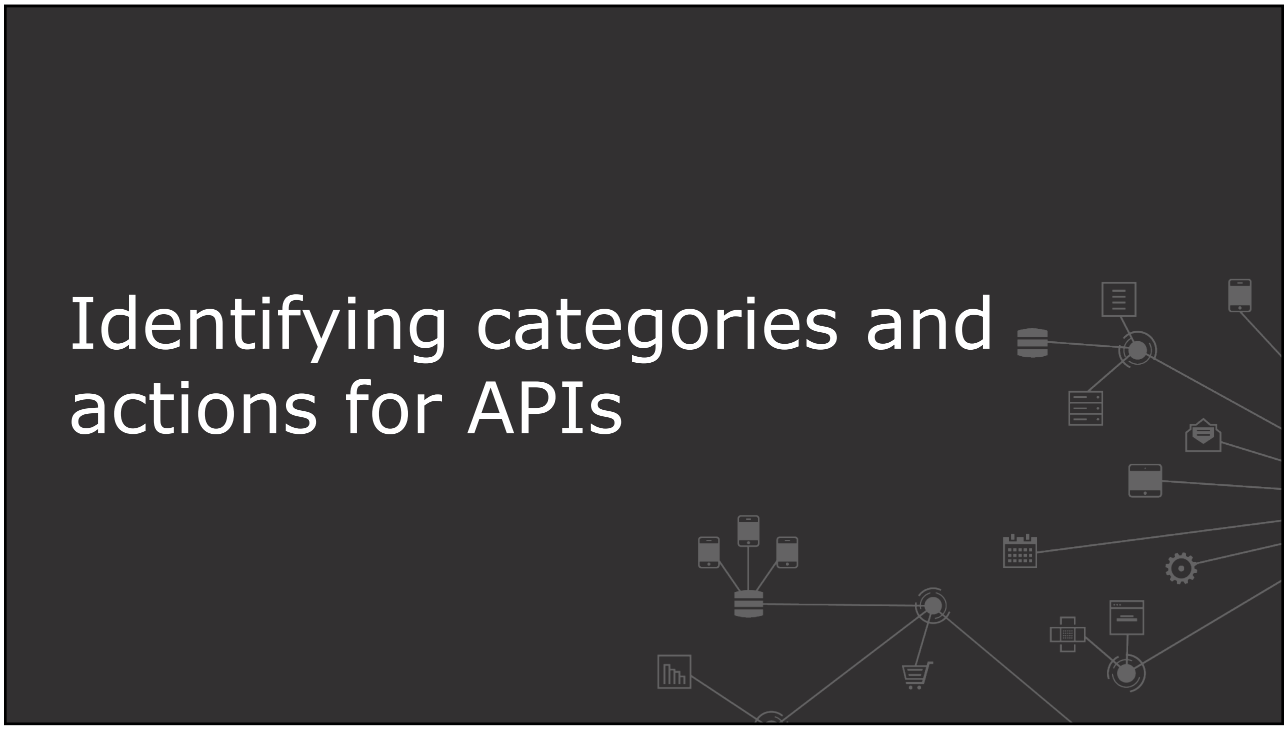


Objectives

- Identify the different categories and actions for a REST API
- Convert categories to resources
- Select HTTP methods to support the actions on categories



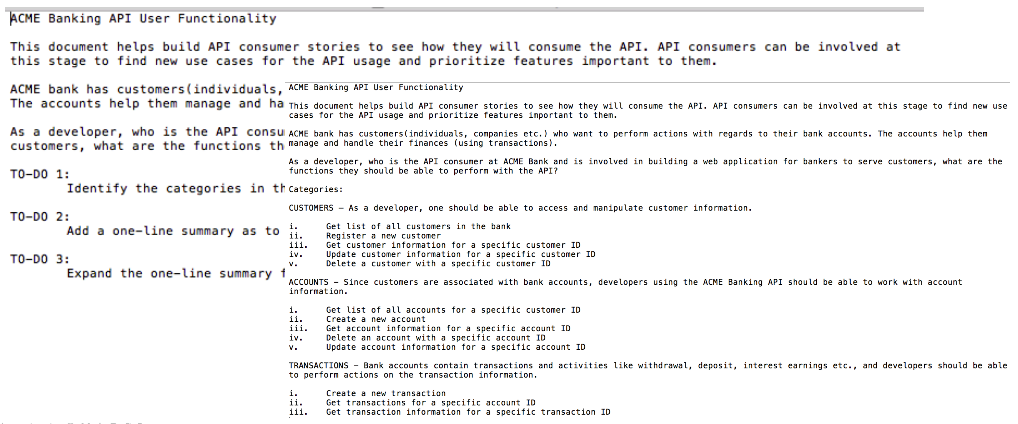
Identifying categories and actions for APIs

Defining categories and actions for APIs

- Categories
  - Define and group information into entities with common characteristics
  - Always a noun
    - Identified from the requirements and the functionality that the API should serve
- Actions
  - Do something with a category
  - Always a verb

Walkthrough 2-1: List the categories and actions for an API

- Identify the categories for a banking API
- Define actions for the categories to decide how users will consume the API



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TO-DO 1:
        Identify the categories in th

TO-DO 2:
        Add a one-line summary as to

TO-DO 3:
        Expand the one-line summary f
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iv.     Delete an account with a specific account ID
v.      Update account information for a specific account ID

TRANSACTIONS – Bank accounts contain transactions and activities like withdrawal, deposit, interest earnings etc., and developers should be able
to perform actions on the transaction information.

i.      Create a new transaction
ii.     Get transactions for a specific account ID
iii.    Get transaction information for a specific transaction ID
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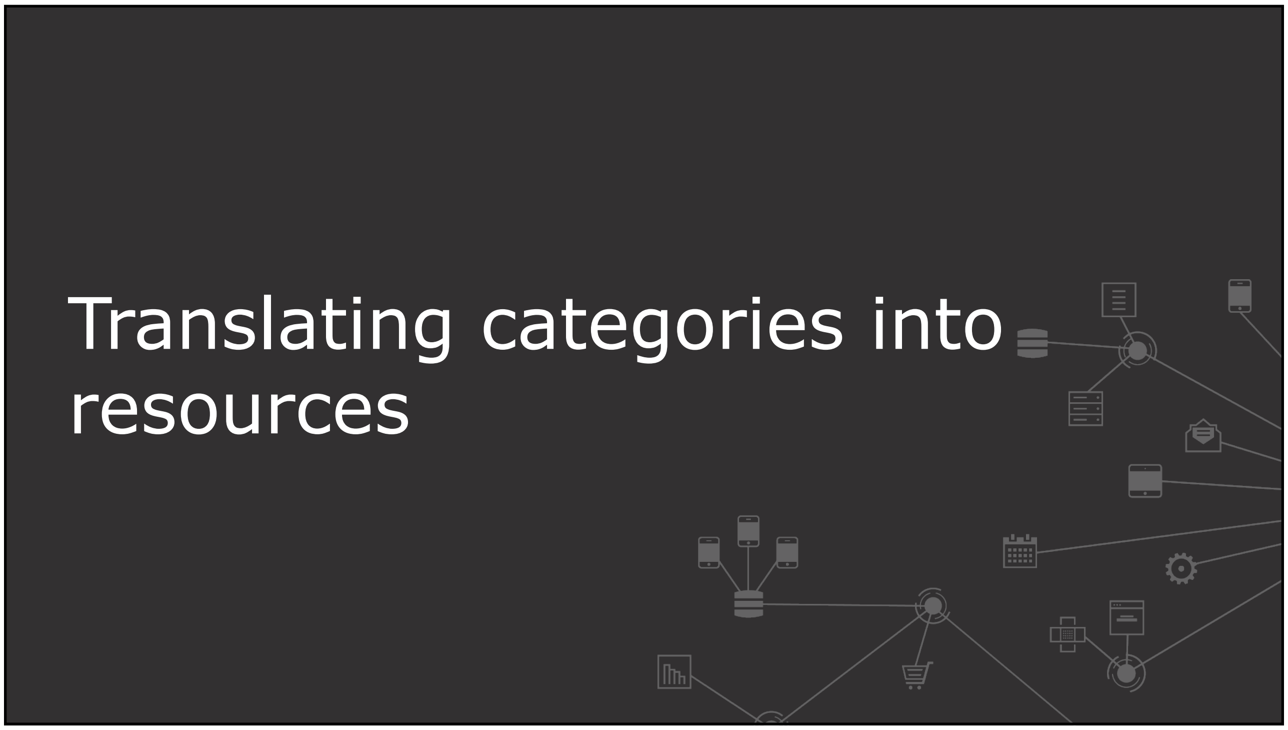
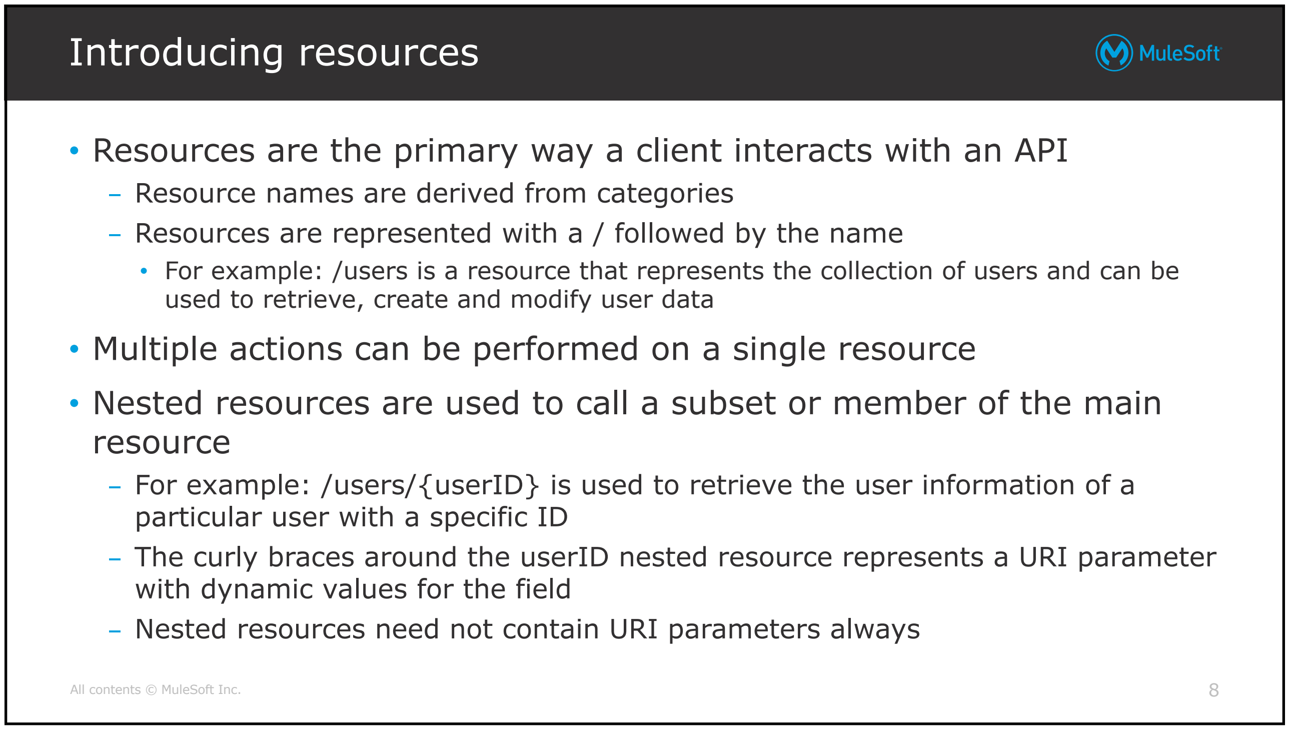


Translating categories into resources



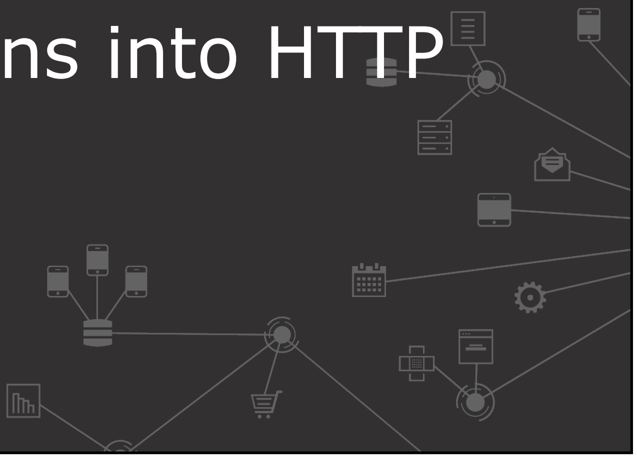
Introducing resources

- Resources are the primary way a client interacts with an API
  - Resource names are derived from categories
  - Resources are represented with a / followed by the name
    - For example: /users is a resource that represents the collection of users and can be used to retrieve, create and modify user data
- Multiple actions can be performed on a single resource
- Nested resources are used to call a subset or member of the main resource
  - For example: /users/{userID} is used to retrieve the user information of a particular user with a specific ID
  - The curly braces around the userID nested resource represents a URI parameter with dynamic values for the field
  - Nested resources need not contain URI parameters always

Best practices for creating resources

- Decoupled architecture
  - Don’t tie resources to specific methods in the backend
  - Changes in the backend will not change consumer interactions with the API
- Nouns
  - Using verbs as a part of the resource name indicates tight coupling with a specific action the resource might perform (similar to RPC) - avoid it
  - Use plural form of nouns, if possible
    - Allows interaction with a collection (multiple records), referred to as collection resources
    - To access a member resource (single record), represent them as a nested resource
- Support multiple content types
  - Results in an extremely flexible and usable API

Translating actions into HTTP methods



Introducing HTTP methods

- HTTP methods are derived from the actions described for categories
- HTTP methods transport resource information and instructions between systems and applications

Commonly used methods in HTTP/1.1

- GET
  - Used to request data
- POST
  - Creates a new object within a collection
  - Transmits the object in the body of the request
  - Sends the URI of the object created, in the response
- PUT
  - Updates an object or creates a new one if it does not exist
  - Overwrites an existing object
    - Critical to send the entire object data in the request, else it replaces missing data with null
  - Should not be used as a POST method to create new objects

Other supported methods in HTTP/1.1

- PATCH
  - Makes partial update to an object
  - Not required to send the entire object in the request
- DELETE
  - Deletes an object
  - Can be very dangerous to use on collections and thus should be avoided or greatly limited (similar to PUT and PATCH)
- OPTIONS
  - Returns the quick list of methods that are allowed on a specific resource
- HEAD
  - Used to get information about a particular data and not the data itself

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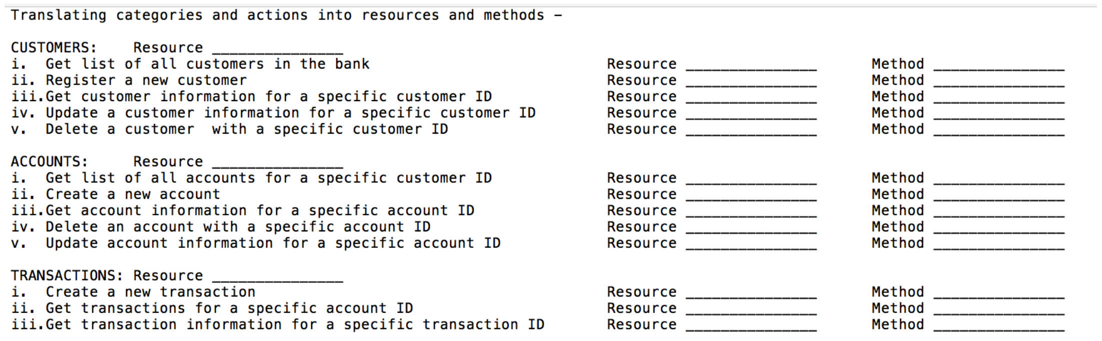
Walkthrough 2-2: Translate categories and actions into resources and methods

- Translate categories into resources
- Identify the HTTP methods for the actions



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Translating categories and actions into resources and methods -

CUSTOMERS:    Resource _______________
i.   Get list of all customers in the bank                       Resource _______________      Method _______________
ii.  Register a new customer                                     Resource _______________      Method _______________
iii. Get customer information for a specific customer ID         Resource _______________      Method _______________
iv.  Update a customer information for a specific customer ID    Resource _______________      Method _______________
v.   Delete a customer  with a specific customer ID              Resource _______________      Method _______________

ACCOUNTS:     Resource _______________
i.   Get list of all accounts for a specific customer ID         Resource _______________      Method _______________
ii.  Create a new account                                        Resource _______________      Method _______________
iii. Get account information for a specific account ID           Resource _______________      Method _______________
iv.  Delete an account with a specific account ID                Resource _______________      Method _______________
v.   Update account information for a specific account ID        Resource _______________      Method _______________

TRANSACTIONS: Resource _______________
i.   Create a new transaction                                    Resource _______________      Method _______________
ii.  Get transactions for a specific account ID                  Resource _______________      Method _______________
iii. Get transaction information for a specific transaction ID   Resource _______________      Method _______________
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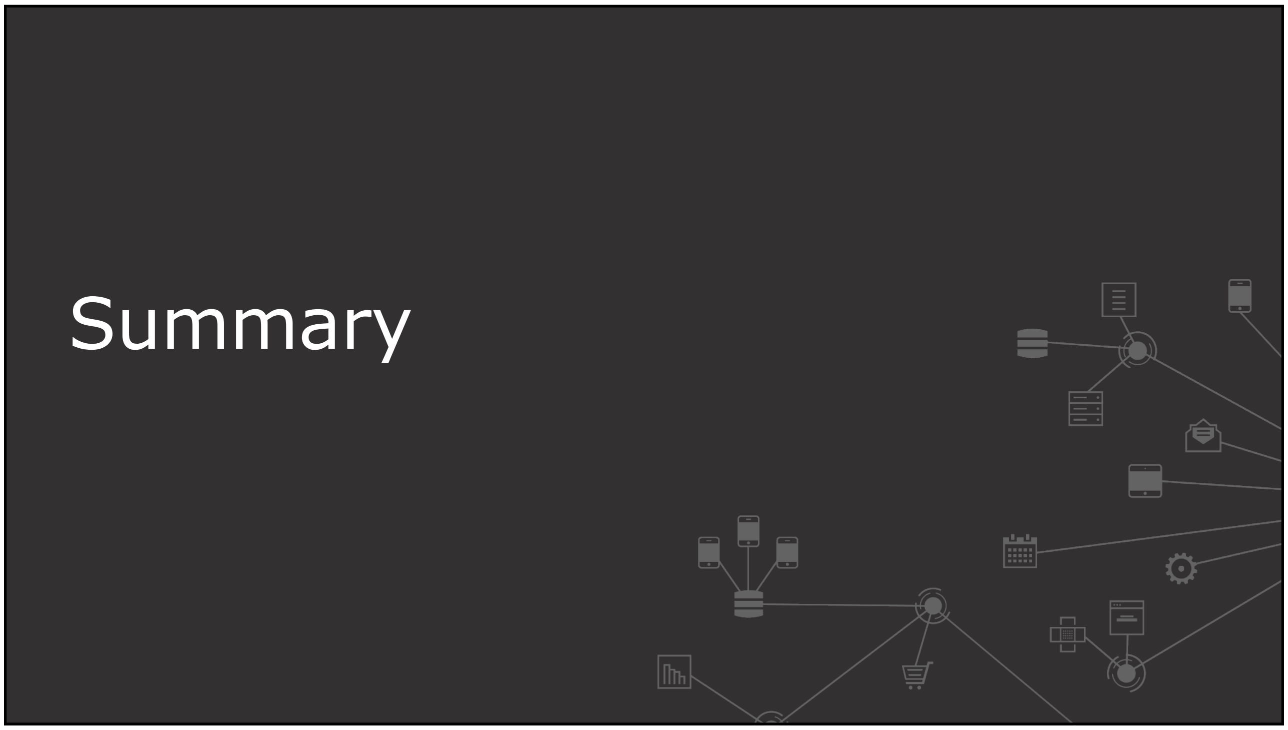
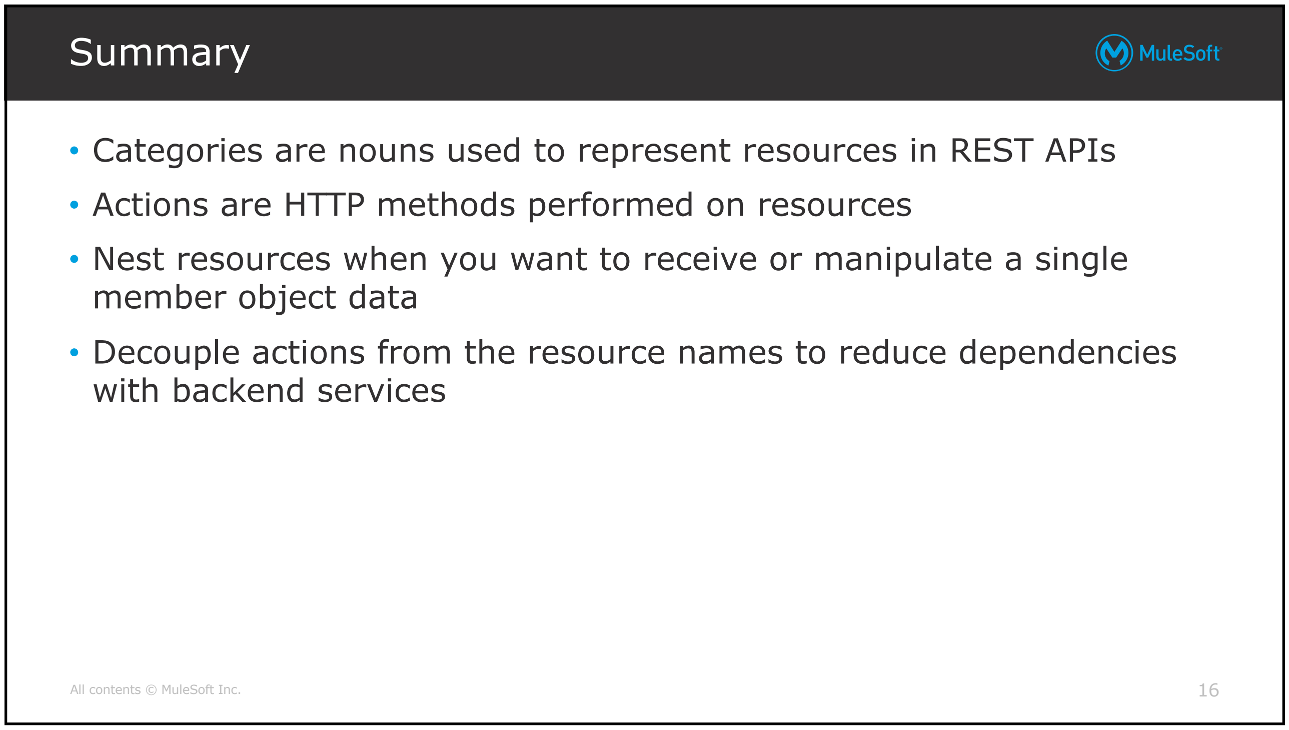


Summary



Summary

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- Categories are nouns used to represent resources in REST APIs
- Actions are HTTP methods performed on resources
- Nest resources when you want to receive or manipulate a single member object data
- Decouple actions from the resource names to reduce dependencies with backend services