

# Adoption of BIAN APIs in Day-to-Day Development

July 28th, 2020





A Warm Welcome to YOU –  
Dialing in From all around the globe!

# On Today's Webinar

- **Hans Tesselaar**  
BIAN Executive Director



## PNC Speakers:

**Michael Nitsopoulos** – SVP Strategy, Innovation and Architecture



**Natalie Gilbert** –  
Software Developer,  
API Center of Excellence



**Luke Kraus** –  
Software Developer  
API Center of Excellence



# Introduction | Mission

To provide the world with the best banking interoperability architecture. To be the banking technology standard.

Central objectives for IT in the banking industry are to lower the IT and operational costs of the bank and help banks mitigate the risks associated with technology innovation. To provide a trusted roadmap for constant innovation.

By collaborating and sharing in an open way, the best expertise across our global ecosystem of **leading banks, technology providers, FinTech players, academics and consultants** to define a revolutionary banking technology framework that standardizes and simplifies the overall banking architecture.



# Introduction | BIAN & Financial Institutions



# Introduction | BIAN & Partners



 **PNC BANK**  
 **BIAN**

# Introduction | BIAN & Academic, Standard Bodies and Training Partners



# PNC – Adoption of BIAN APIs

July 28, 2020



# Agenda

## Topic

## Summary

Introduction

PNC presenter introductions

Adoption of BIAN APIs

Overview of PNC's adoption of BIAN

Developing with BIAN

The use of BIAN in day-to-day development

BIAN-Inspired Innovation and Extending the Model

PNC innovation inspired by BIAN to accelerate time-to-market and  
Continuous feedback loop to extend and improve the model

Q&A

Open Q&A with the PNC team



# INTRODUCTION

# Introduction



**Natalie Gilbert**

Software Developer, API Center of Excellence



**Luke Kraus**

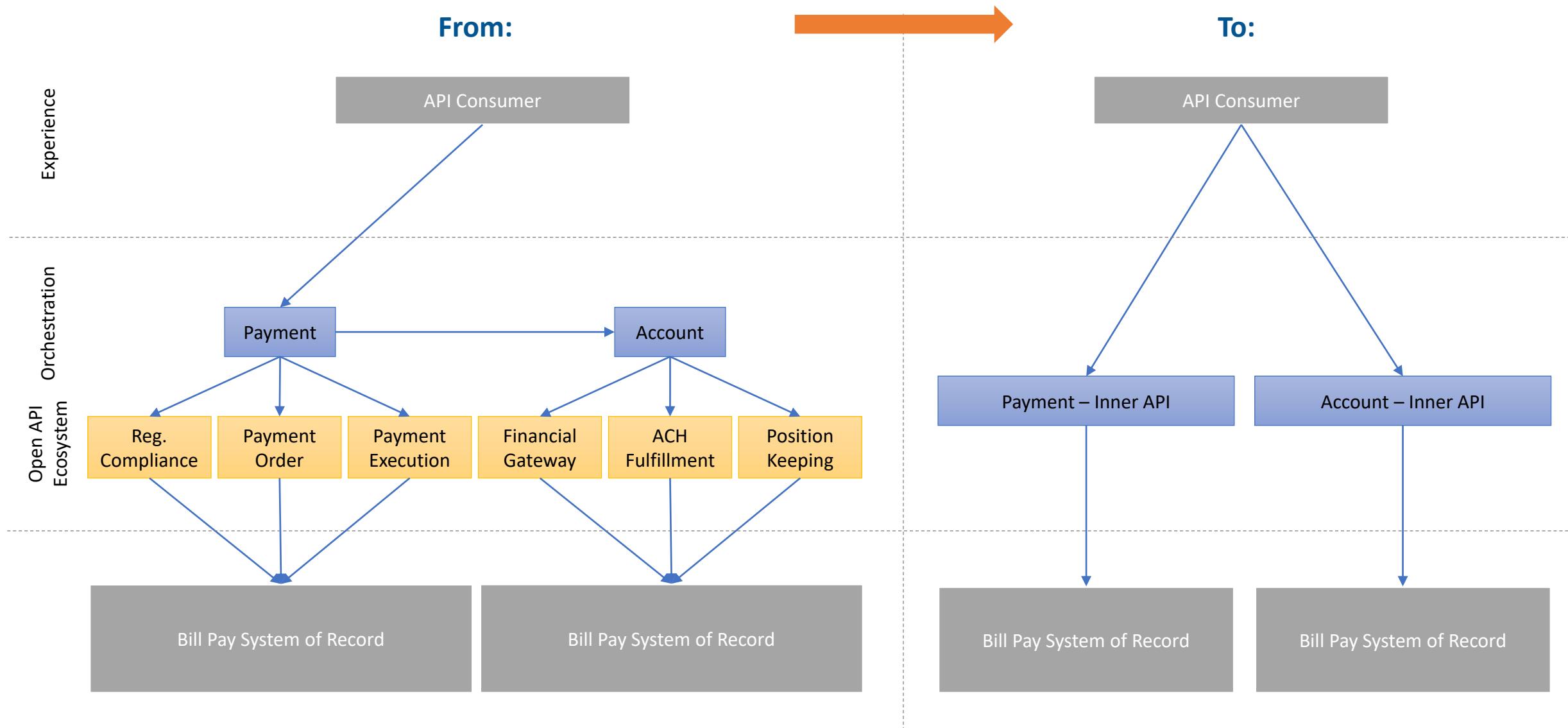
Software Developer, API Center of Excellence



## ADOPTION OF BIAN APIS

# BIAN Inspired APIs

Moving from fine-grained endpoints to logical endpoints representing business functionality



# Adoption of BIAN APIs

PNC's new architecture strategy includes 'Inner APIs' which perform a single function and align to BIAN standards

## Experience

Fine-grained representation of a user interaction. Specific user function, only concerns itself with performing that function as best as possible

## Outer API

Tightly coupled to the UI, provides the data necessary for display purposes by the UI. It is the Outer APIs job to filter out unnecessary data and to **orchestrate** invocations across many Inner.

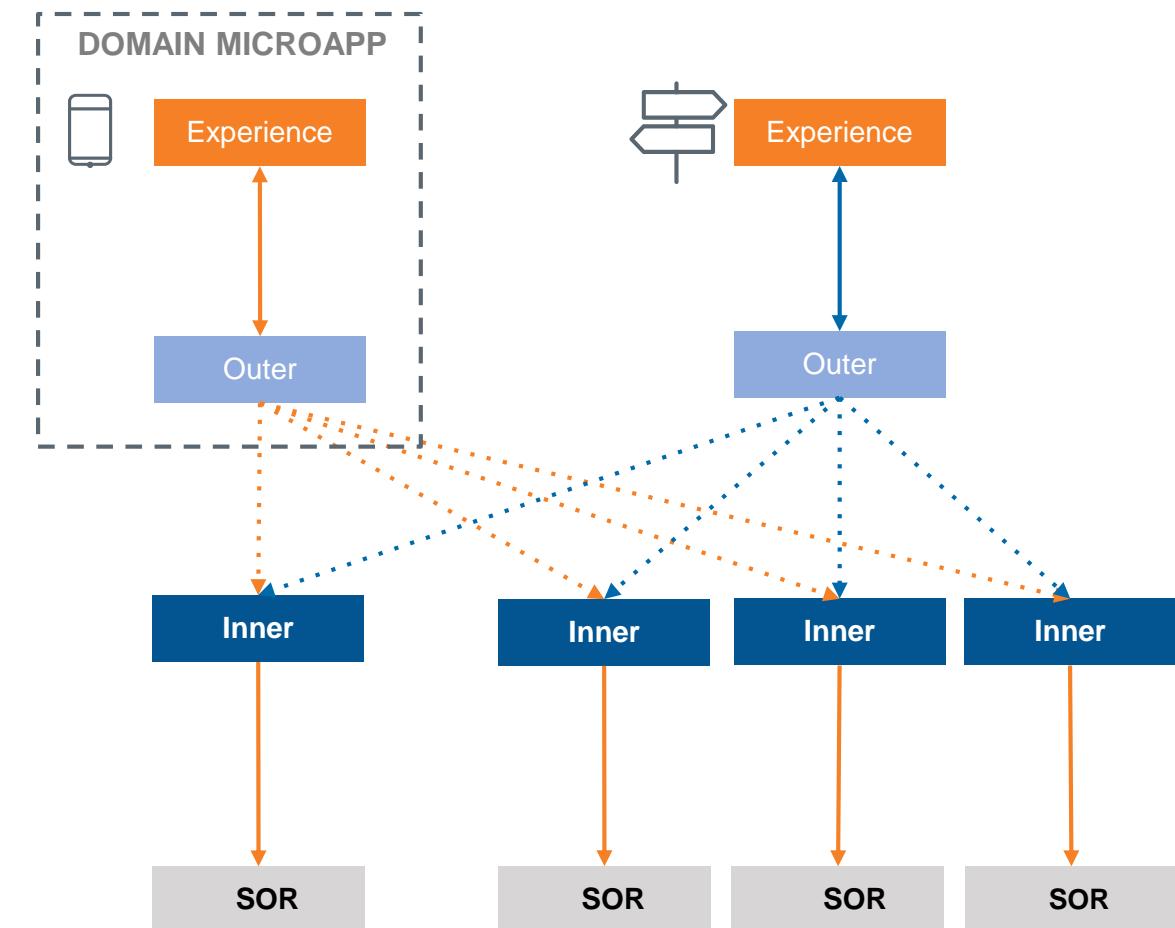
## Inner API (BIAN Inspired)

Exposes all functionality and data contained within a SOR to the enterprise. The Inner API's evolution is tied to the evolution of the SOR and should only **perform one function**, allowing for abstraction from the SOR

Inner APIs are inspired from the BIAN API Model and leverage the BIAN Object Model (BOM) to model their inputs/outputs

- To avoid vendor lock-in and provide a BIAN inspired Inner API, we must build our own Inner APIs
- This principle is important to abstract out Vendor Systems of Record
- An Inner API will need to be built that calls the Vendor's proprietary API

## New PNC Architecture





# DEVELOPING WITH BIAN

# Developing with BIAN

PNC has developed a number of tools to integrate the BIAN framework and data modeling standards across the development lifecycle

## API Discovery

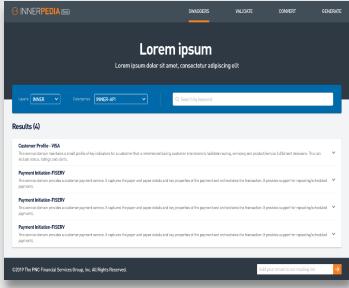
## API Toolkit

## Generator & Validator

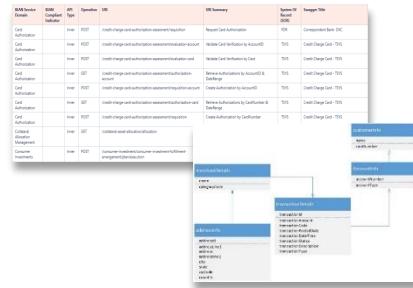
## Pipeline Enforcement

## Compliance Dashboard

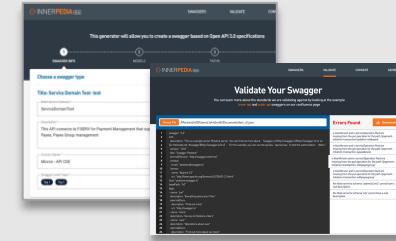
**Innerpedia**



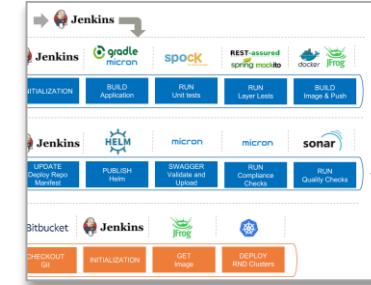
**Endpoint Catalog & API model**



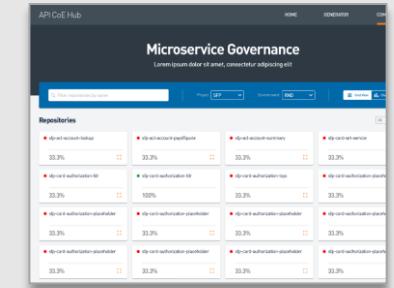
**Swagger Generator & Validator**



**GitOps Pipeline**



**Compliance Dashboard**



### Description

Catalog of endpoints, inspired by the BIAN endpoint console, for individuals to discover in-development and completed endpoints

- Promotes re-use
- Provides all Inner APIs in one unified location
- Allows users to understand how to leverage and call specific services

Mechanism for users to select BIAN-inspired PNC endpoints and build their payload from already modeled entities and properties

- Improves time-to-market by accelerating development cycles
- Enables seamless integration and data sharing across systems

Tools that generates and auto-populates swaggers with data from the API Toolkit while ensuring adherence to BIAN and PNC standards

- Accelerates modeling and development time in-line with contract-based development
- Enables users to better self-serve and check for adherence to standards

Pipeline outfitted with various enforcement capabilities to ensure standards are enforced

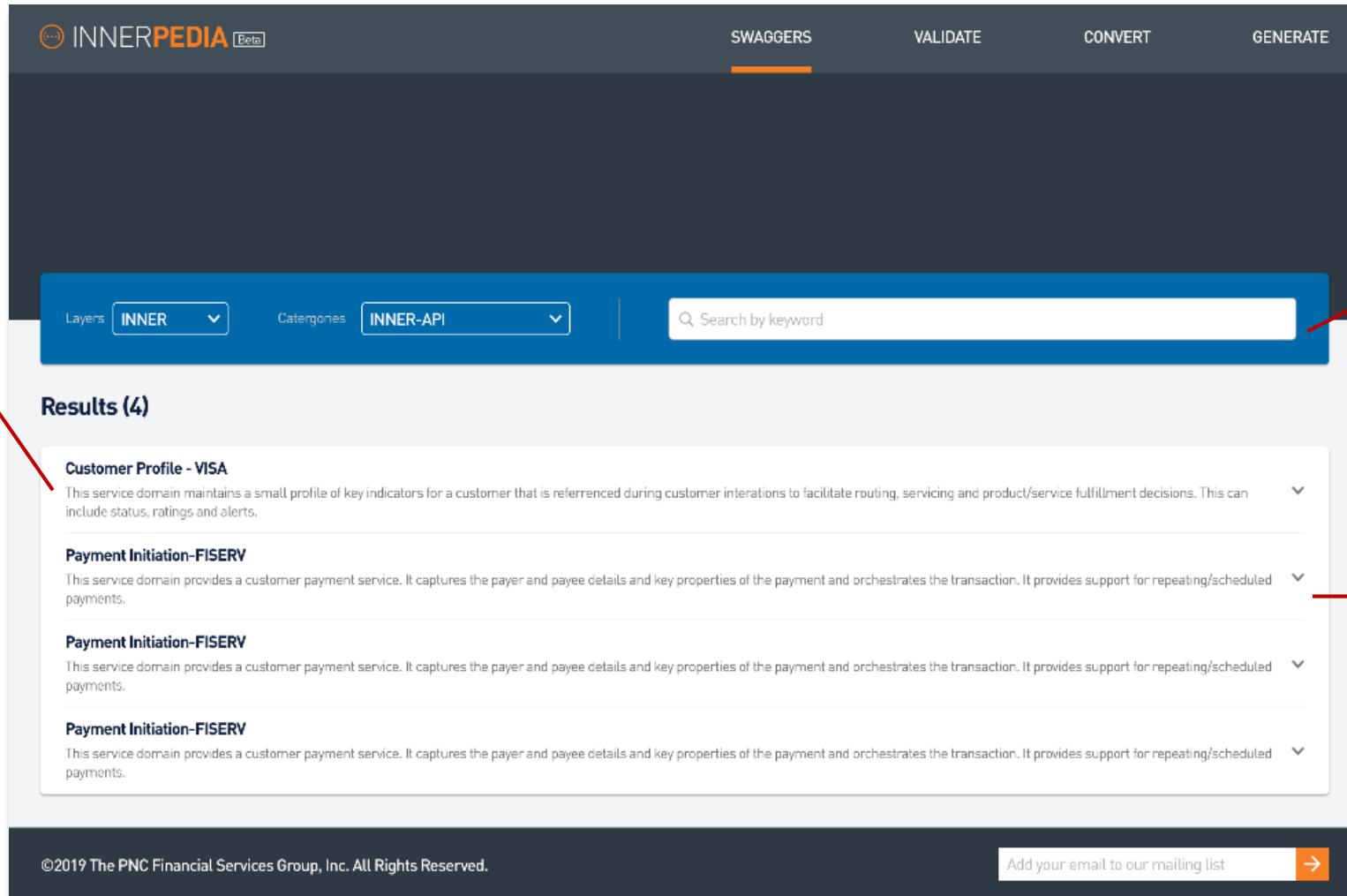
- Automated pipeline checks ensure applications meet our set standards
- Enforcement mechanism to ensure applications not modeled correctly do not reach production

Compliance dashboard aggregates microservices' adherence to leading practices

- Increased visibility into application compliance
- Alerts simplify management of 'drifted' applications

# Innerpedia

Innerpedia is PNC's central repository for inner APIs, allowing users to search and understand the capabilities of each of API while promoting re-use and adherence to BIAN naming conventions



The screenshot shows the Innerpedia web application. At the top, there is a navigation bar with tabs: SWAGGERS (highlighted in orange), VALIDATE, CONVERT, and GENERATE. Below the navigation bar, there are dropdown menus for 'Layers' (set to INNER) and 'Categories' (set to INNER-API). To the right of these is a search bar with the placeholder 'Search by keyword'. The main content area displays a section titled 'Results (4)' containing four service domain descriptions:

- Customer Profile - VISA**  
This service domain maintains a small profile of key indicators for a customer that is referenced during customer interactions to facilitate routing, servicing and product/service fulfillment decisions. This can include status, ratings and alerts.
- Payment Initiation-FISERV**  
This service domain provides a customer payment service. It captures the payer and payee details and key properties of the payment and orchestrates the transaction. It provides support for repeating/scheduled payments.
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This service domain provides a customer payment service. It captures the payer and payee details and key properties of the payment and orchestrates the transaction. It provides support for repeating/scheduled payments.

At the bottom of the page, there is a footer with the text '©2019 The PNC Financial Services Group, Inc. All Rights Reserved.' and a mailing list sign-up form with the placeholder 'Add your email to our mailing list' and a red '→' button.

## Inner API Naming

Applications follow the standard naming convention of: '**BIAN Service Domain - SOR**'

## Searching

Type keywords here to search for any existing APIs that perform the service you are looking for

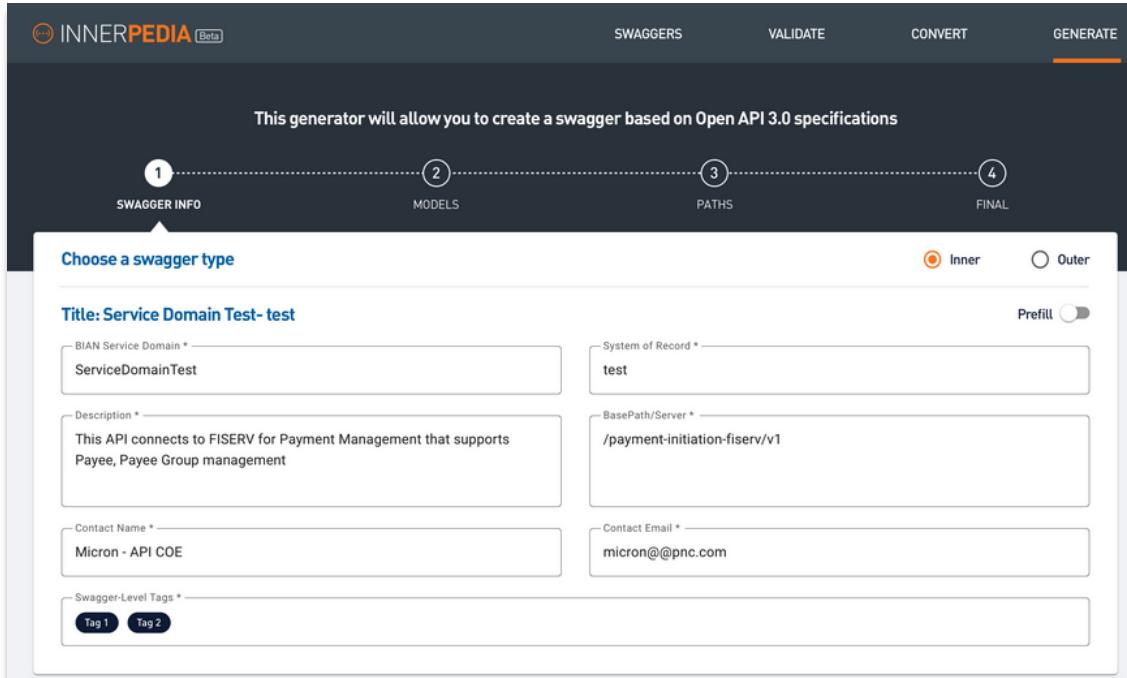
## Descriptions

Descriptions of the service domain have been provided, as well as examples of use to provide specific use cases for each microservice

# Swagger Generator & Validator

The Swagger Generator and Validator were built to help users model their services uniformly and in adherence with PNC and BIAN standards

## Swagger Generator



This generator will allow you to create a swagger based on Open API 3.0 specifications

- 1 SWAGGER INFO
- 2 MODELS
- 3 PATHS
- 4 FINAL

**Choose a swagger type**

**Title:** Service Domain Test - test

**BIAN Service Domain \***: ServiceDomainTest

**System of Record \***: test

**Description \***: This API connects to FISERV for Payment Management that supports Payee, Payee Group management

**BasePath/Server \***: /payment-initiation-fiserv/v1

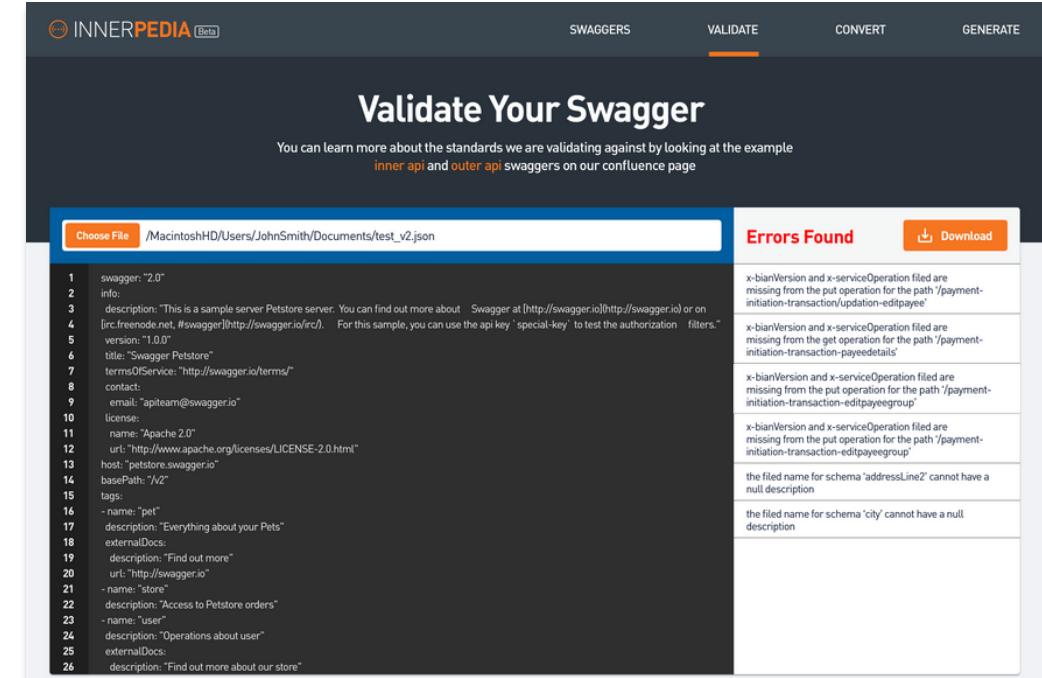
**Contact Name \***: Micron - API COE

**Contact Email \***: micron@pnc.com

**Swagger-Level Tags \***: Tag 1, Tag 2

**Prefill**  Inner  Outer

## Swagger Validator



INNERPEDIA Beta

SWAGGERS VALIDATE CONVERT GENERATE

### Validate Your Swagger

You can learn more about the standards we are validating against by looking at the example inner api and outer api swaggers on our confluence page

Choose File: /MacintoshHD/Users/JohnSmith/Documents/test\_v2.json

**Errors Found**

```

1  swagger: "2.0"
2  info:
3    description: "This is a sample server Petstore server. You can find out more about Swagger at [http://swagger.io](http://swagger.io) or on [irc.freenode.net, #swagger](http://swagger.io/irc/). For this sample, you can use the api key 'special-key' to test the authorization filters."
4    version: "1.0.0"
5    title: "Swagger Petstore"
6    termsOfService: "http://swagger.io/terms/"
7    contact:
8      email: "apiteam@swagger.io"
9    license:
10       name: "Apache 2.0"
11       url: "http://www.apache.org/licenses/LICENSE-2.0.html"
12       host: "petstore.swagger.io"
13       basePath: "/v2"
14       tags:
15         - name: "pet"
16           description: "Everything about your Pets"
17           externalDocs:
18             description: "Find out more"
19             url: "http://swagger.io"
20             - name: "store"
21               description: "Access to Petstore orders"
22             - name: "user"
23               description: "Operations about user"
24               externalDocs:
25                 description: "Find out more about our store"
26

```

- Mechanism for users to build swaggers (contracts) in accordance with PNC standards
- Includes stored BIAN and API model data so that fields auto-populate and restrict the user from deviating from modeling guidelines

- The validator provides users the opportunity to check that their swagger is compliant, providing feedback for any errors
- The tool checks to ensure naming conventions, BIAN standards, and other modeling rules are adhered to

# Compliance Dashboard

The compliance dashboard allows both development teams and managers to monitor adherence to modeling and swagger standards

The screenshot shows the API CoE Hub interface with the 'COMPLIANCE' tab selected. The main title is 'Microservice Governance'. Below it is a placeholder text: 'Lorem ipsum dolor sit amet, consectetur adipiscing elit'. The top navigation bar includes 'API CoE Hub', 'HOME', 'GENERATOR', and 'COMPLIANCE'. The search bar contains 'Filter repositories by name'. The project dropdown is set to 'SFP' and the environment dropdown is set to 'RND'. The view mode is currently 'Grid View'. The main content area is titled 'Repositories' and displays a 4x4 grid of service names. Most services show a red dot and 33.3% compliance, except for one which shows a green dot and 100% compliance.

Repository	Compliance Status	Percentage
sfp-acl-account-lookup	Red Dot	33.3%
sfp-acl-account-payoffquote	Red Dot	33.3%
sfp-acl-account-summary	Red Dot	33.3%
sfp-card-art-service	Red Dot	33.3%
sfp-card-authorization-fdr	Green Dot	100%
sfp-card-authorization-tsys	Red Dot	33.3%
sfp-card-authorization-placeholder	Red Dot	33.3%

- The compliance dashboard displays compliance checks that are performed when applications are built and deployed
- Provides a mechanism to check for adherence to specific standards, like swagger and data modeling compliance



# PNC AND BIAN PARTNERSHIP

# BIAN-Inspired Innovation & Partnership

The API Toolkit, a combination of the Endpoint Catalog and API Model, is a key enabler in ensuring BIAN standards are adhered to at PNC and provides PNC a mechanism to enhance the BIAN industry framework

## Endpoint Catalog

Universe of all BIAN-inspired endpoints mapped to service domains and their corresponding SORs

### Endpoint Catalog

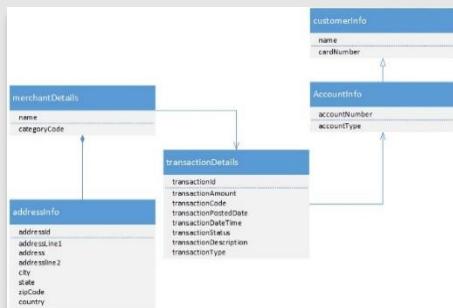
BIAN Service Domains	BIAN Compliant Indicator	API Type	Operation	URI	URI Summary	System Of Record (SOR)	Swagger Title
Credit Authorization	Inner	POST	/credit-charge-card-authorization-assessment/equation	Request Card Authorization	TSYS	Correspondent Bank-DIC	
Credit Authorization	Inner	POST	/credit-charge-card-authorization-assessment/evaluation-account	Validate Card Verification by AccountID	TSYS	Credit Charge Card - TSYS	
Credit Authorization	Inner	POST	/credit-charge-card-authorization-assessment/evaluation-card	Validate Card Verification by Card	TSYS	Credit Charge Card - TSYS	
Credit Authorization	Inner	GET	/credit-charge-card-authorization-assessment/authorization-account	Retrieve Authorizations by AccountID & DateRange	TSYS	Credit Charge Card - TSYS	
Credit Authorization	Inner	POST	/credit-charge-card-authorization-assessment/requisition-account	Create Authorization by AccountID	TSYS	Credit Charge Card - TSYS	
Credit Authorization	Inner	GET	/credit-charge-card-authorization-assessment/authorization-card	Retrieve Authorizations by CardNumber & DateRange	TSYS	Credit Charge Card - TSYS	
Credit Authorization	Inner	POST	/credit-charge-card-authorization-assessment/requisition	Create Authorization by CardNumber	TSYS	Credit Charge Card - TSYS	
Collateral Allocation Management	Inner	GET	/collateral-asset-allocation/allocation	Retrieve resource report	NFS	Credit Charge Card - TSYS	
Consumer Investments	Inner	POST	/consumer-investment/consumer-investment-fulfillment-arrangement-plan/exeution	Create a plan for projections	BIV	Credit Charge Card - TSYS	

- Ensures all endpoints developed leverage BIAN standards
- Identifies areas to extend BIAN endpoints to meet PNC requirements

## API Model

A collection of ER models that details entity and property relationships for each service domain, depicted in logical ER diagrams and provided to users in a JSON format

## ER Model



- Provides modeled out entities and properties for each BIAN service domain
- Allows for automated population of swaggers to ensure standardized modeling and naming conventions are used across development teams

## Extending the Model | PNC and BIAN Partnership

The work and analysis conducted to develop the Endpoint Catalog and API Model provide a mechanism for PNC to contribute to the BIAN model by extending both the framework's endpoint list and Business Object Model (BOM)

### Feedback Loop:

- ① Leverage the existing BIAN endpoint list and customize them for PNC's use cases and transactions
- ② Understand PNC SOR capabilities and map them to the BIAN model
- ③ Host working sessions to ensure PNC-inspired endpoints and models align to the BIAN framework
- ④ Extend the BIAN framework to meet PNC requirements
- ⑤ Contribute back the delta between PNC requirements and the existing model to help grow, enhance, and evolve the overall framework



THANK YOU

# BIAN's Internal Wiki and Official Homepage



# Member driven organization

- Fees (annual membership)
- Software / Tech vendors / Integrators  
(250 employees or more)
  - EUR 30.000,-
- Banks / FI's that are not vendors
  - EUR 20.000,-
- Software / Tech vendors / Integrators  
(less than 250 employees)
  - EUR 10.000,-
- Federal Banks / Central Banks
  - EUR 10.000,-
- Software / Tech vendors / Integrators  
(less than 50 employees)
  - EUR 5.000,-
- Academic Partners
  - EUR 0,-

# 2020 - BIAN Open Webinars



## Complimentary BIAN Webinar: **Creating BIAN's Financial Industry Data Model**

In this webinar we will introduce the **BIAN Way** of creating Financial Industry Data Models.

June

**8**

3pm - 4pm (CEST)  
9am - 10am (EDT)

Can't make it on June 8?  
Sign-up anyway we send you the recording.

Sign up today!

**REGISTER**

BIAN is using the Business Object Oriented Enterprise Modeling approach, which is a combination of 4 modelling patterns. The resulting data models are consistent from the perspective of structure and content. In the methodology BIAN is making a strict distinction between the "things" with their attributes and "information" about the things.

We will explain the methodology briefly and illustrate it with an BIAN examples by using the positioning of the "BIAN Control Records" (Business Functions) as basic information models to ensure BIAN Business Object Model will become clear and consistent.



## Complimentary BIAN Webinar: **BIAN & ACTUS PoC - The Power of Algorithmic Financial Contracts**

The ACTUS Financial Research Foundation has published an open source algorithmic standard for financial contracts. The ACTUS contracts are the key generic building blocks of finance because they define the cashflow-patterns of all major banking instruments, which are the starting point for all analytics about the contracts. This perspective makes it possible to go beyond conventional point-in-time valuations by projecting future cashflows in a flexible and highly consistent way to enable a whole range of important analyses.

For the PoC we have applied the ACTUS standard to extend the higher level BIAN semantic product specifications. The PoC shows – as an example – how a bank can produce for a customer a consolidated view of his or her position across the many diverse products they hold - projecting out their future financial health considering many different market and even employment scenarios. For example, they can use these powerful analytical insights to determine the best type of mortgage for which they should apply.

In the webinar we will cover the lessons learned mapping ACTUS to BIAN, demonstrate the PoC and discuss some of the powerful insights and perspectives the ACTUS algorithmic data can support looking beyond the examples of the PoC. The analytical engine for the PoC is provided

June

**15**

4pm - 5pm (CEST)  
10am - 11am (EDT)

Can't make it on June 15?  
Sign-up anyway we send you the recording.

Sign-up today!



## Complimentary BIAN Webinar: **Global Open Banking Initiatives and the added value of the BIAN Open Standards**

An introduction to Open Banking around the world, classifying them into Regulatory-Mandated, Regulatory-Encouraged and Market-Driven initiatives, looking at the common trends in terms of Financial Institutions and Products in scope, Consent Management and Technical Security Standards.

June

**29**

4pm - 5pm (CEST)  
10am - 11am (EDT)

Can't make it on June 29?

# 2020 - BIAN Open Webinars



Complimentary BIAN Webinar:  
**Introduction to the BIAN Landscape and some testimonials of BIAN implementations**

Open Banking is a hot topic for financial institutions all over the world. The ultimate objective is to exchange financial information and information services between players in this fast changing eco system.

BIAN, the Banking Industry Architecture Network, provides an Open Banking Reference Architecture and framework that can leverage and speed up standardization of semantic Open

July

1

4pm - 5pm (CEST)  
10am - 11am (EDT)

Can't make it on July 1?



Complimentary BIAN Webinar:  
**BIAN Coreless Bank initiative aims to promote a more efficient and effective approach to modernising banking software**



BIAN's Coreless Banking Proof of Concept demonstrates the following functions:

- Complete plug and play functionality, to ensure no impact to user experience
- Fully deployable to the cloud, so organizations can take advantage of modern software development techniques
- Bank consumable API interface to orchestrate (where necessary) BIAN APIs and reduce network traffic

July

14

3pm - 4pm (CEST)  
9am - 10am (EDT)

Can't make it on July 14?  
Sign-up anyway we send you the recording.

# Questions?

Please stay muted and type  
your Questions in the righthand  
bar, or send them to  
[info@bian.org](mailto:info@bian.org)

