Connecting IBM i to Amazon Marketplace

SIMPLIFYING INTEGRATION AT SPEED

MIDRANGE DYNAMICS
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- Building and implementing products on AS400-IBMi since 1995
  - X-Analysis, X-Migrate, X-2E, LXR, Rest4i, MDCMS
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RPG REST Tools & Frameworks for IBM i

Built-In-RPG-Functions	MDRESt4i	ILEASTIC	HTTPAPI/ YAJL	IWS	HTTPCLOB
Structured JSON Parsing	✓	✓	✓	✗	✗
REST APIs	✓	✓	✓	Web Service	NA
Consumers	✓	✓	✓	NA	✓
JSON Writing Functions	✓	✓	✓	✗	✗
SSL	✓	✓	✓	✓	✓
Token Authentication (JWT/JWS/OIDC) & Credential Management	✓	✗	✗	✗	✗
API/Consumer Documentation	✓	✗	✗	✗	✗
Generate Consumers/API's from Swagger	✓	✗	✗	✗	✗

Why do companies upgrade from Open Source to MDREST4i?

- **Less to learn** before building production grade solutions
- **Learn while developing** production-grade solutions
- **Productivity** – 90% less coding
- **Better Quality** – fewer human errors in basic code structures, complex, critical communications and security logic
- **At scale, much lower TCO** - 1 developer can produce the entire Open Banking API suite in RPG in 2 minutes, vs 5 developers 6- 12 months (excluding analysis, planning, design, learning REST and RPG Frameworks) to reach the same point
- **Significantly more functionality** – documentation, credential management, & many other lower level built in JSON/XML and REST functions
- **Significantly lower risk** – team of full-time developers backed by a global organization vs 1 or 2 aging part-timers

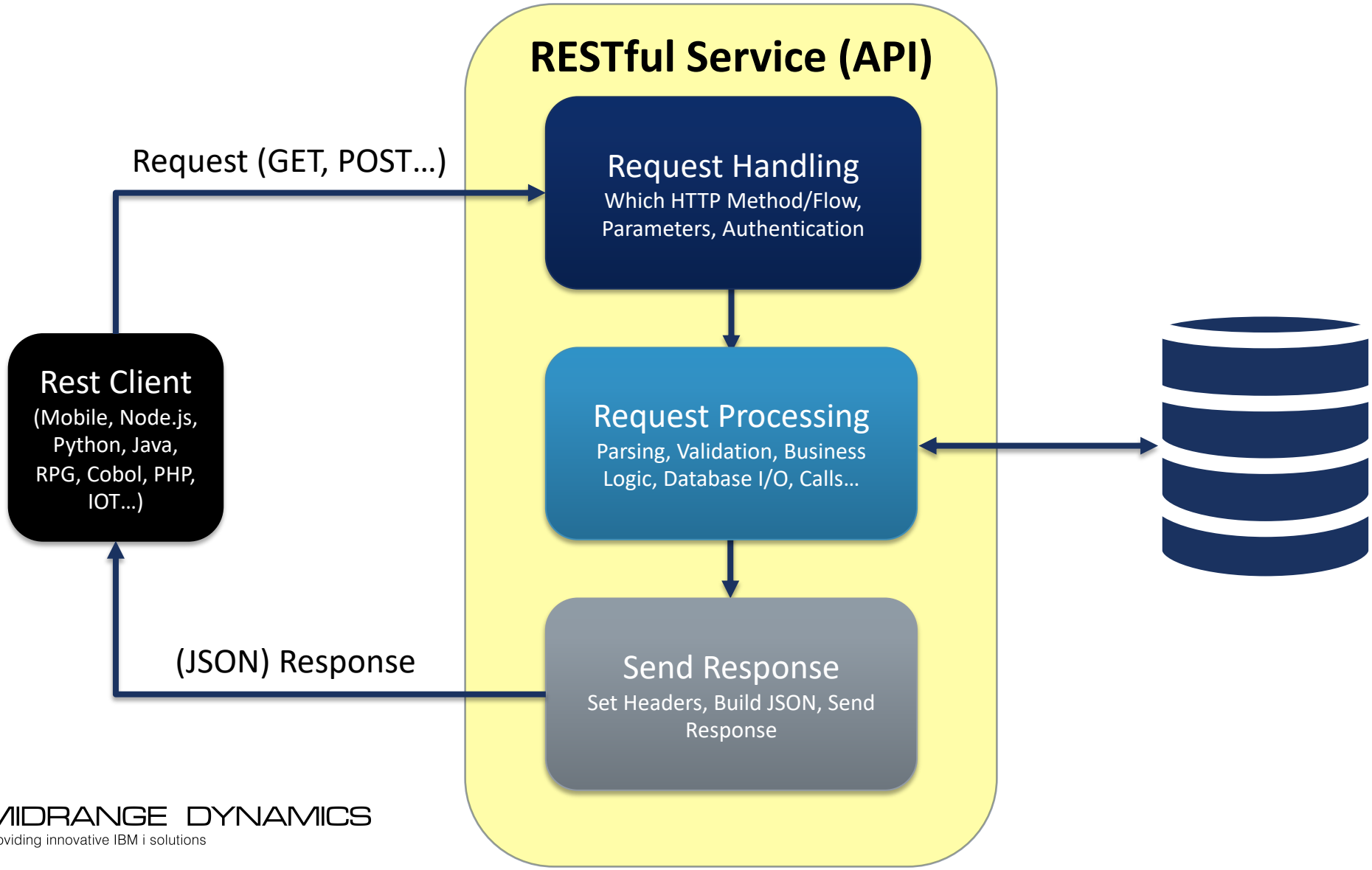
INTRODUCING MARKETPLACE WEB SERVICES & SELLING PARTNER API

- Selling Partner API (SP-API) is the modernized version of the Marketplace web services

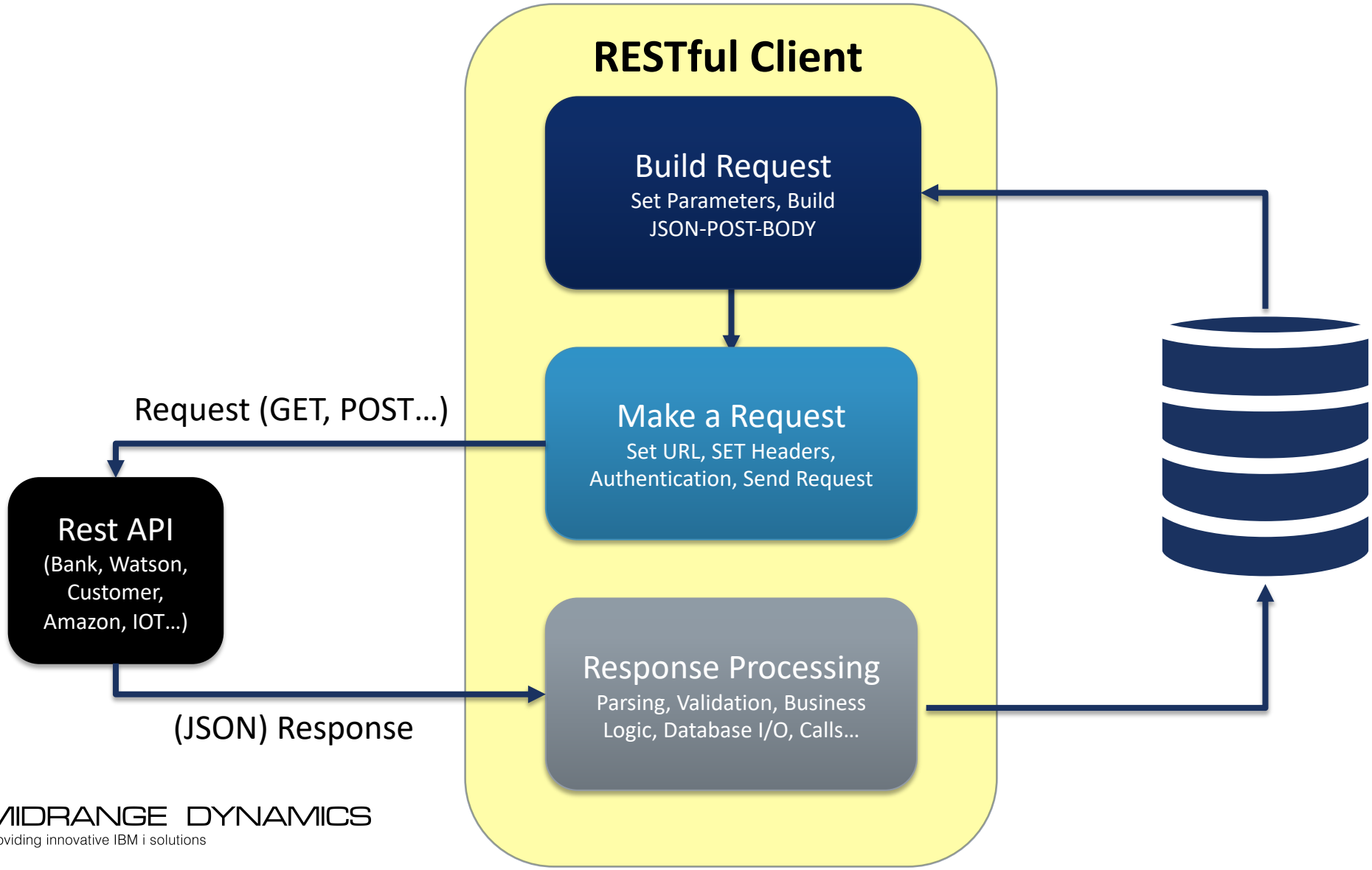
WHERE DO I START?

- Read the API documentation
- Setup test authentication and find endpoints (AWS test env, User)
- Test requests in POSTMAN/SOAP-UI/ARC (Hardcoded values in test env)
- Build the consumer program in RPGLE

HOW A REST SERVICE (API) Works



HOW A REST CLIENT (Consumer) Works



MAIN FUNCTIONS OF A CONSUMER (CLIENT) PROGRAM

- Build the Request
- Make the Request
- Process the Response

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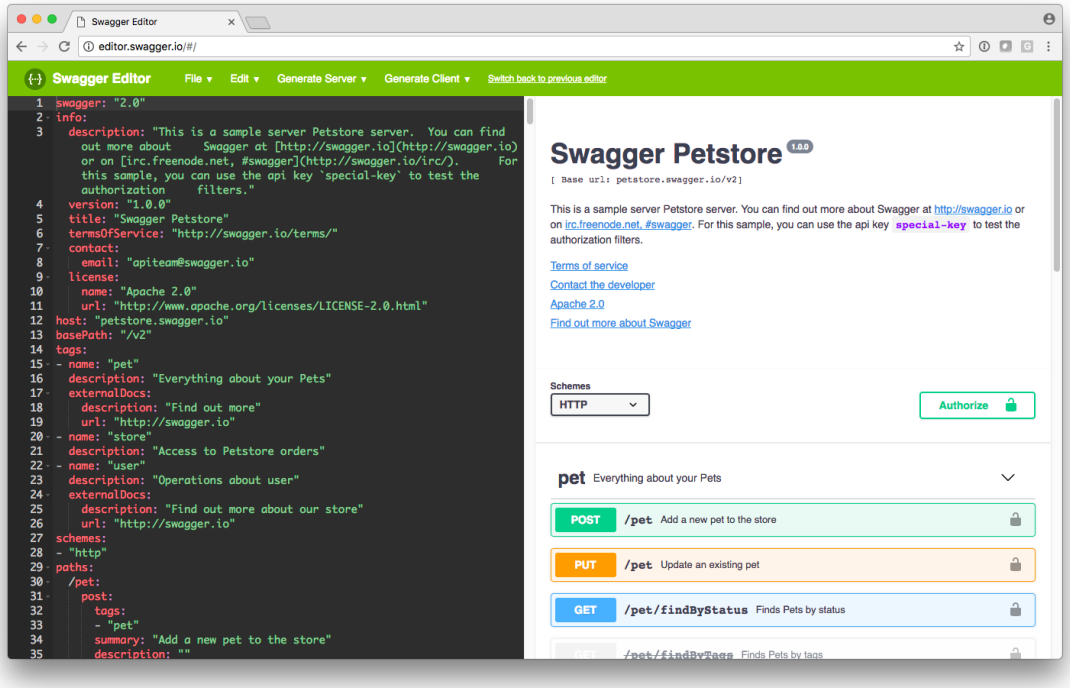
READING API DOCUMENTATION (DEMO)

- https://developer.amazonservices.com
- https://github.com/amzn/selling-partner-api-docs
- Download the Swagger/OAPI & specs
- Look for:
  - Endpoints/resources (Available API's)
  - Authentication/security (OAUTH/Tokens)
  - Input and Output Payloads (JSON, Headers, Parameters)

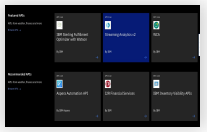
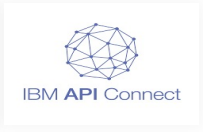
WHAT IS SWAGGER OR OPEN API SPECIFICATION?

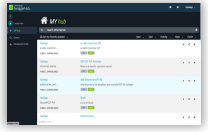
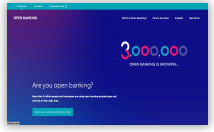
- Swagger is an Interface Description Language for describing RESTful APIs. Swagger is used together with a set of open-source software tools to design, build, document, and use RESTful web services.

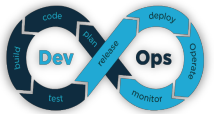


A FEW IMPORTANT REASONS PEOPLE USE SWAGGER/OPEN API

- Flexibility – Portable, define anything, machine/human readable
- Improve Productivity – code generation, automate migration/deployment
- Improve Testing – automate and standardize testing
- Improve Security – auditable assets and policy implementation
- Industry Standard – Amazon, Google API/Cloud, IBM API Hub, IBM API Connect, SWAGGER Hub, OpenBanking/PSD2, Fedex API, Jira/Azure/GitHub/Jenkins

Amazon

SWAGGER/OPEN API – THE MAIN PARTS

General	Uses JSON or YAML, general info – title, description, contact etc. 3.0.2 latest version
Servers	http/s address of the server/s that you find the api on
Path	/mdrdemod/clients – the actual path
Method	HTTP method could be any of GET/POST/PUT/PATCH/DELETE
parameters	parameters used when making a request to the APi
requestBody	JSON sent when making request
responses	HTTP Status codes that can be expected and the format of HTTP headers and body for each
Components/Schemas	the JSON schema for the models of requests and responses

OAPI Structure

- Info
- /apipath/api (array)
  - method
    - parameters (array)
    - requestBody
    - responses
- Servers
- Components

BUILD THE CONSUMER (DEMO)

- Import the swagger (or import the JSON response/request samples
- Generate the code
- TODO: Edit the RPG to connect to your own data/programs

BUILD A REQUEST

- Payload
  - Format (JSON, XML, x-www-form-urlencoded)
- Parameters
  - Query
  - Path
  - Headers
  - Request Body
- Headers

  JWS, Pagination, Parameters…

HTTP Messages

Start Line – Describes the request to be implemented, or the response status of whether successful or a failure. This start-line is always a single line.

Headers – set of HTTP headers specifying the request, or describing the body included in the message.

Body – body containing data associated with the request (like content of an HTML form or JSON request), or the document/json/xml associated with a response.

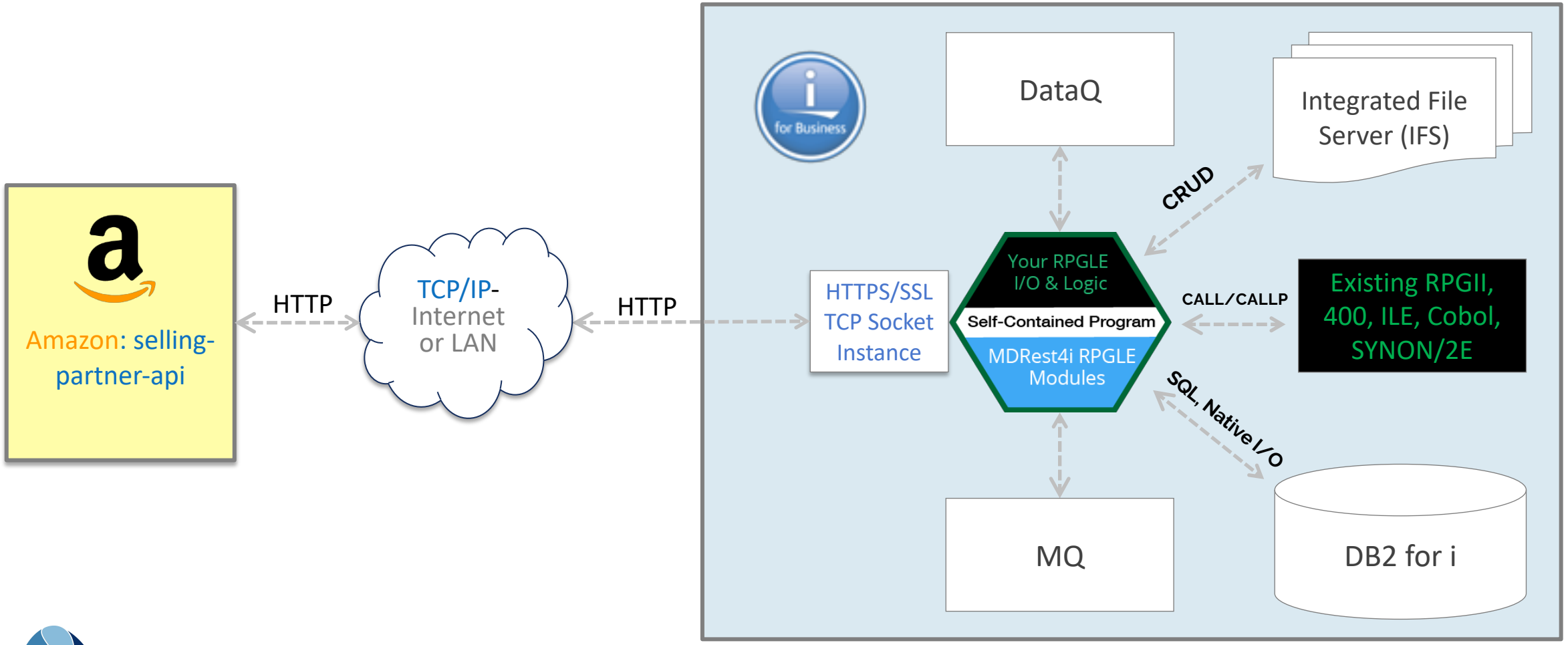
MAKE A CONNECTION

- URI
  - Server
  - ServicePath
- Method
  - GET, POST, PUT, PATCH, DELETE
- Headers
  - Payload type (JSON, XML, x-www-form-urlencoded)
  - Authentication – Tokens/Basic
- Security
  - SSL/TLS (message encryption)
  - JWS (JSON Web Signature)
  - Proxy

PROCESS THE RESPONSE

- Check HTTP Status
  200=OK
- Extract Headers
  X-HeaderName
- Parse Body
  Validation & Configuration

CONNECTING IBM i to AMAZON



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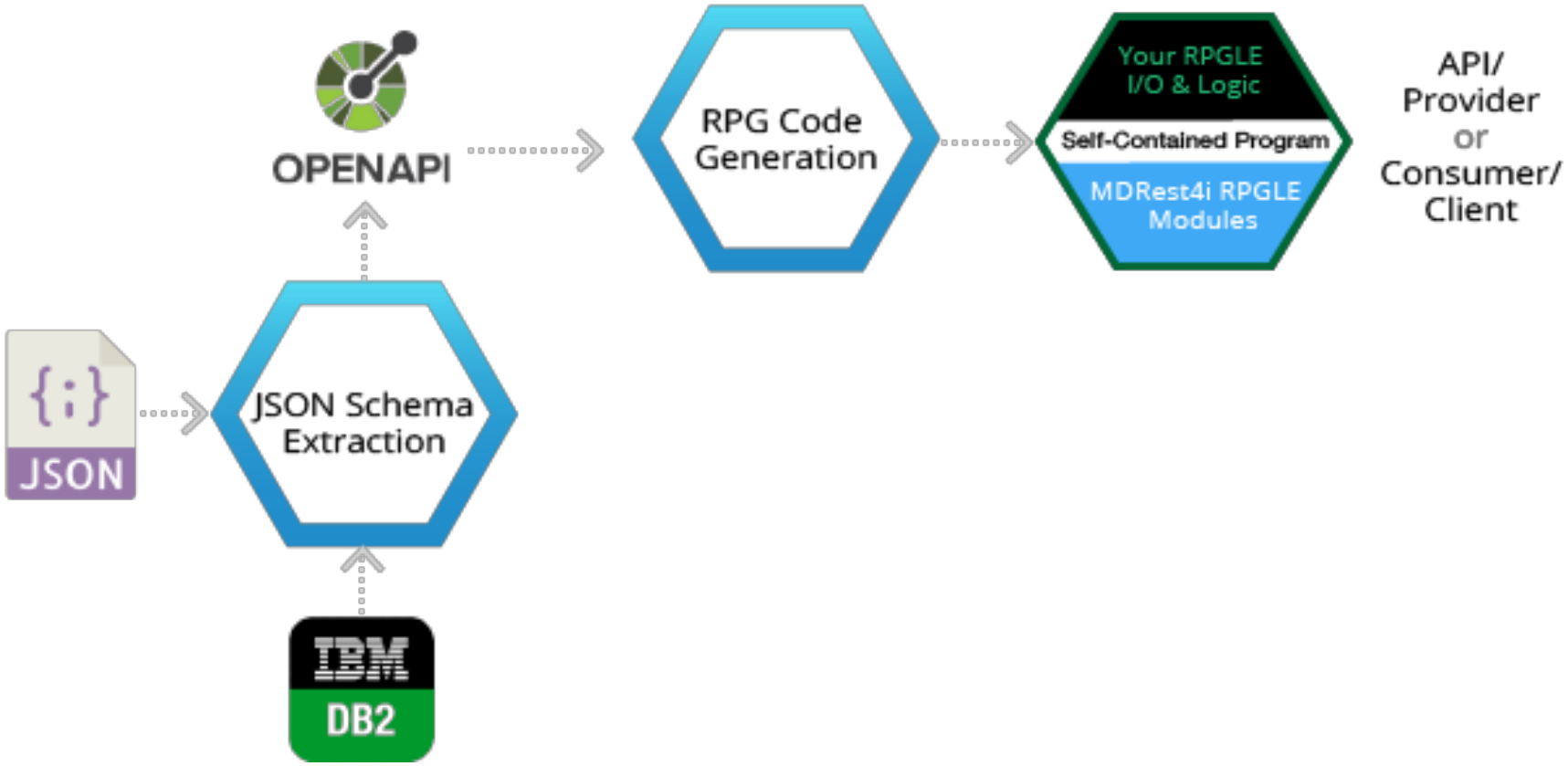
ALTERNATIVE INPUT SPECS



LOW CODE DEVELOPMENT FOR REST API's AND CONSUMERS

Code Frameworks :
(MDReSt4i iCore)

- Standard Code Templates
- Parsing Functions
- Data Translation/Conversion
- Encoding/Decoding
- Encryption/Decryption
- Authentication
- Parameter Handling
- JSON/XML Building Functions
- IFS Handling
- Error Handling
- Standard Headers
- Custom Headers
- Standard Responses
- Custom Responses
- OAuth2, OIDC, JWT

+

Code Generators :
(MDRest4i SDK)

- All Variables
- Qualified Data Structures
- Required Functions
- Tailored Parameter Handling
- SQL Statements
- JSON Building Logic
- JSON Parsing Logic
- Tailored Code Structure
- Tailored Error Handling

+

RPG Programmer Adds:

- Business Logic
- Calls to Existing Code
- Custom Message Text

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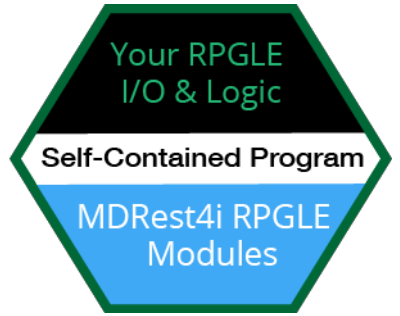

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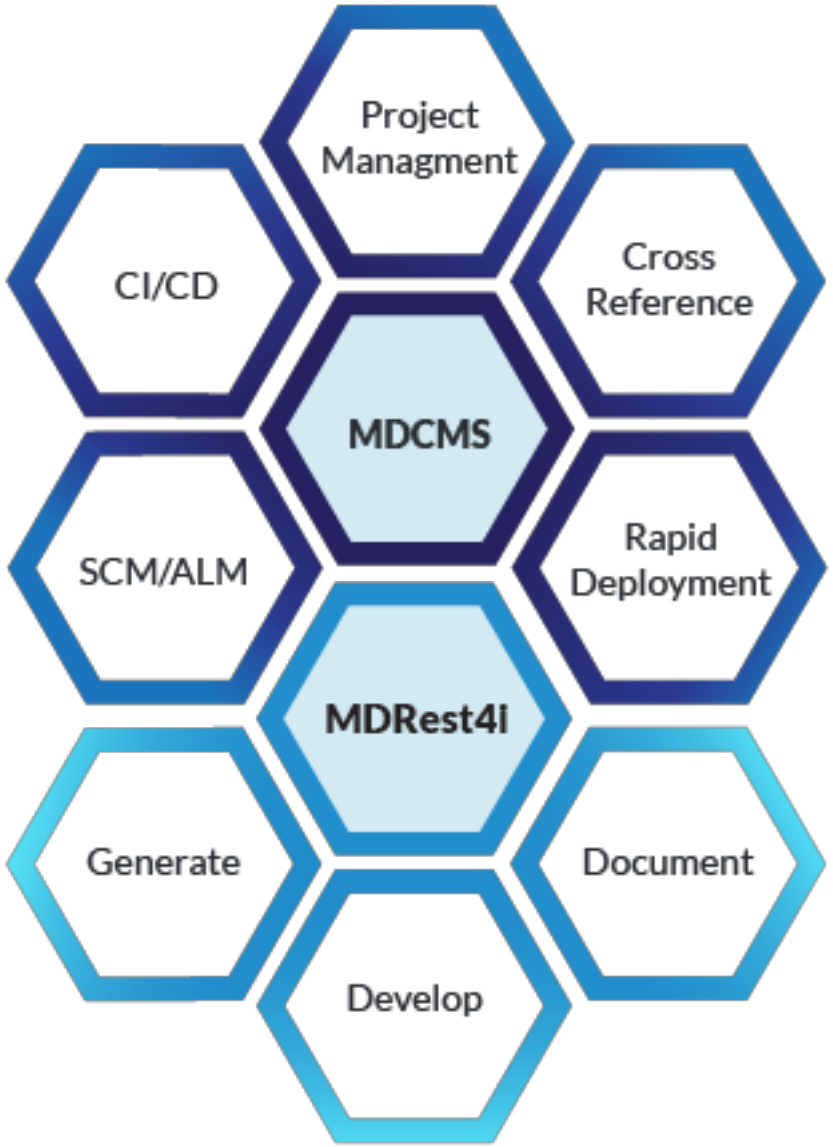

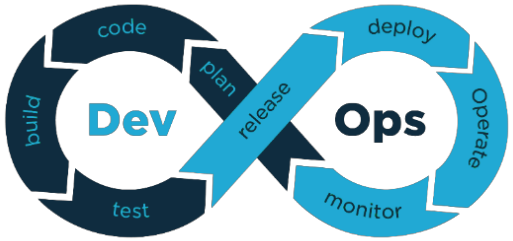

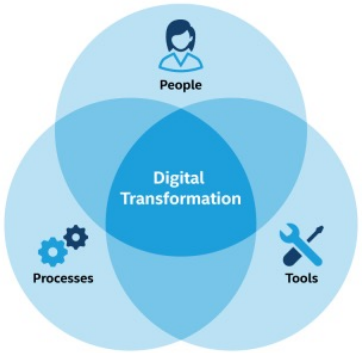

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- Email info@md-na.com
- On the web:

https://www.midrangedynamics.com/contact-us/

- JPColonna Case Study
- Liberty Mutual Case Study

MDREST4I COLLECTION OF COMPARISONS

BY STUART MILLIGAN

MARCH 2021

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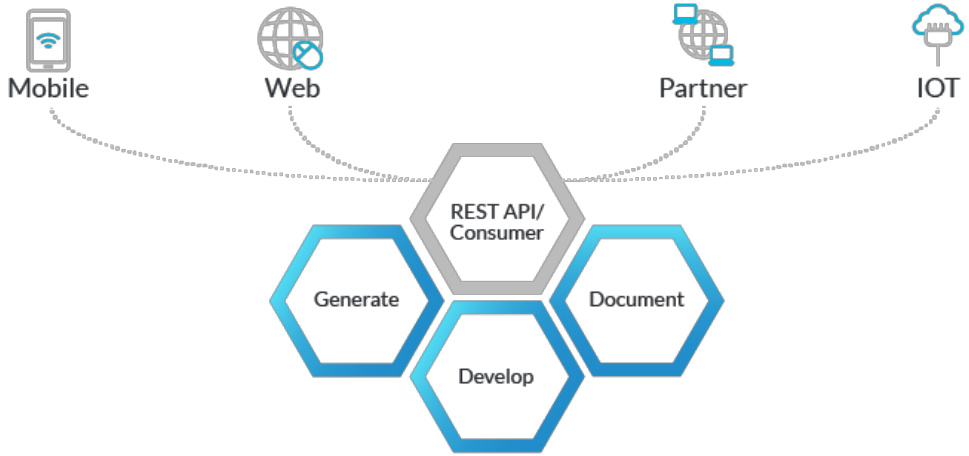
WHAT ARE PEOPLE SAYING ABOUT MDREST4I?

- MDRest4i is one of the slickest tools I have seen on the IBM i in many years.
- I've been an RPG programmer for a long time, and it taps into the power of the IBM i like no other tool I've seen.
- MDRest4i has worked even better than we could have hoped for. Our API strategy has leaped years ahead.
- We had our first REST service running on our IBM i within an hour of downloading MDRest4i.
- Liberty Mutual: made API creation 50 times faster….

MDREST4i – Midrange Dynamics REST API Tools



Generate

Automate generation of boilerplate API and Consumer RPGLE & SQL code from any requirement – SWAGGER or JSON

Develop

Add RPGLE business logic to layered framework - low code maintenance without limiting flexibility

Document

Wizards & GUI to build & edit API specs SWAGGER & export to API Developer Portal & Confluence documentation.

Modern Digital

PSD2, OpenBanking, Digital Transformation, API Economy, Multi-Channel, Mobile, Partners…..

- Java/C#/JavaScript Developers have Skill
- RPG Developers have Skill AND Knowledge
- MDRest4i enables RPG Developers to build REST solutions quicker, that sustain SOR integrity
- You will have to code the extraction and updating of ibm i data in RPG anyway: why add another product/layer in the mix?

ADVANTAGES OVER OTHER IBM i INTEGRATION SOLUTIONS

- Low coding – only code what you need
- Open architecture – easy to debug
- Easy to scale development effort
- Use existing and focused skills
- Handle complex payloads easily
- Highly secure through native methods
- No business logic replication/redundancy
- Protect data integrity with expertise
- Rapid development & change

- Bare metal performance (no middleware/JVM)
- Easy to scale performance
- Easy to scale complexity
- No middle man
  - Performance
  - Obscurity
  - Security

Code everything or run middleware (expensive, slow, rigid, clumsy, complex)

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Why IBM i Developers Use MDRest4i

fast

No middleware, code abstractions, connectivity drivers. Lean, performance optimized code structure for parsing and translations = lightening quick response times

simplified

Layered code architecture using typical RPGLE constructs and concepts, hides complex code while standardizing flow where possible. Low code maintenance without limiting flexibility

structured

Structured code makes development and maintenance of code consistent, easier to learn and debug. Changes are quicker to design, code and test also allowing unit testing

automation

Structured code architecture makes code generation possible. Accelerate development effort rather than replacing it. Templates allow scalable flexibility without limitations

documentation

Structured code architecture makes code documentation easier and facilitates automated documentation. API documentation is critical for benefits of self-service concepts

standards

MDREST4i follows industry standards by default. This lowers risk of code transformation and reusability. It also makes education and training of new staff more cost effective

The Most Effective Way to Leverage Existing Skill, Knowledge & Data

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WHY API DOCUMENTATION MATTERS

Modern applications live and die on the APIs they use. Developers must avoid monolithic systems and embrace agility and flexibility. This is why, of course, it isn't unheard of for companies to rely on dozens of semi-independent (micro)services – either from 3rd parties or internal teams.
That means **we're more reliant than ever on other team's code**. So to make it all play nicely, we must select robust APIs that facilitate project management and development – and **that means using the best API documentation tools from the get-go**.
And it's not just to keep things nice and tidy. It's a competitive advantage.

Why API Documentation Matters
For public APIs, where success equals widespread adoption, getting buy-in requires good documentation. This helps partner organizations evaluate whether they will select this API or a competitor's.
For internal APIs, good documentation means a quicker ability and efficiency in meeting business goals. The faster a team can consume microservice APIs developed by other teams, the faster the company can reach its Minimum Viable Product
And while software documentation is usually static, (think of a book printed on paper) modern API documentation goes well above and beyond. They can offer interactive documentation with richer user experience.
In short: good, interactive documentation **lets us read about the API, but also learn the API** more quickly by viewing example data objects, and by directly interacting with it.