IBM z Systems

CAVMAN 2016

Engage the API Economy with API Connect and System Z

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IBM

Part 1. The digital economy

Part 2. z Systems relevance in the API economy

Part 3. API Connect and z/OS Connect Enterprise Edition

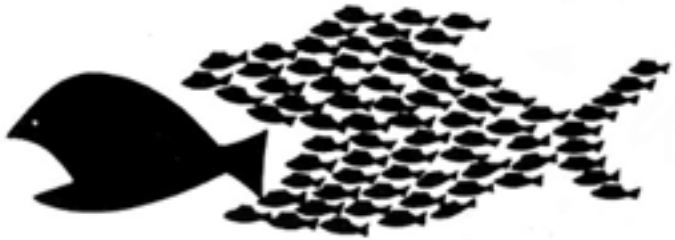
Part 4. Innovation on z Systems with access via APIs

Part 1. The Digital Economy

Enterprises must learn to “Innovate like a Startup”

FROM……..

……TO



“The ‘Uber syndrome’ – where a competitor with a completely different business model enters your industry and flattens you.”

Judy Lemke, CIO, Schneider, United States

“52% of the Fortune 500 firms since 2000 are gone.” – R. Ray Wang

http://blog.softwareinsider.org/2014/02/18/research-summary-sneak-peaks-from-constellations-futurist-framework-and-2014-outlook-on-digital-disruption/

Emerging technologies drive business transformation

Analytics

Moving to real time

+7.6% in customer lifetime value for firms using engagement analytics

$226B – annual cost of health care fraud

Big Data

2.5 billion gigabytes of data generated every day

Cloud

60% of banks process most transactions in cloud by 2016

Mobile

35% transaction growth driven through mobile annually through 2017

Intelligent/ Connected Systems

7.9 million in U.S. adopted NFC e-Wallets

Collaboration

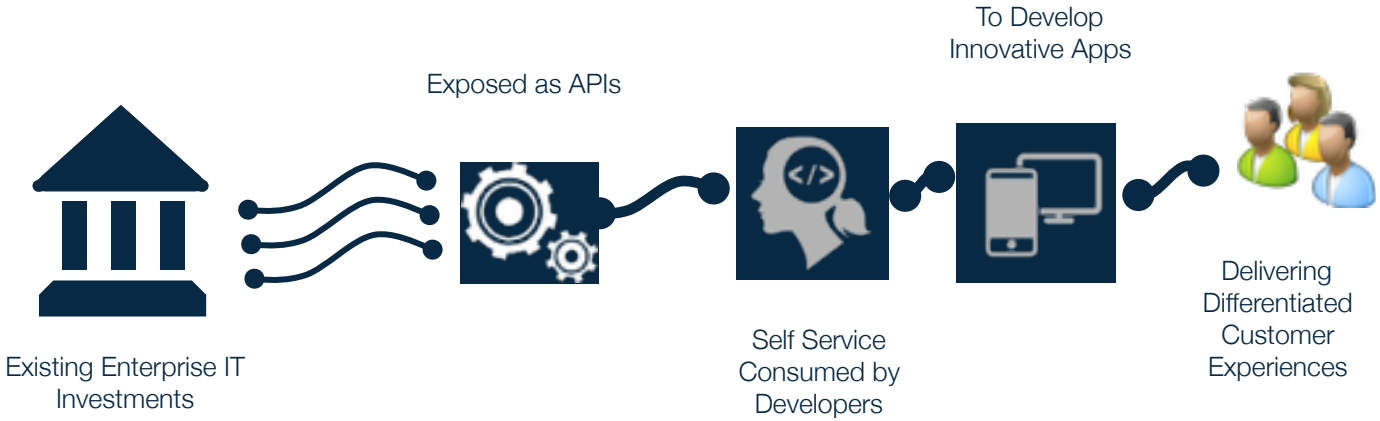
60 million US households conducting P2P payments

Security

$5.65 million – average cost of a security breach in the US

The Strategy is Simple…

Unleash Enterprise Investments to Disrupt Competitors



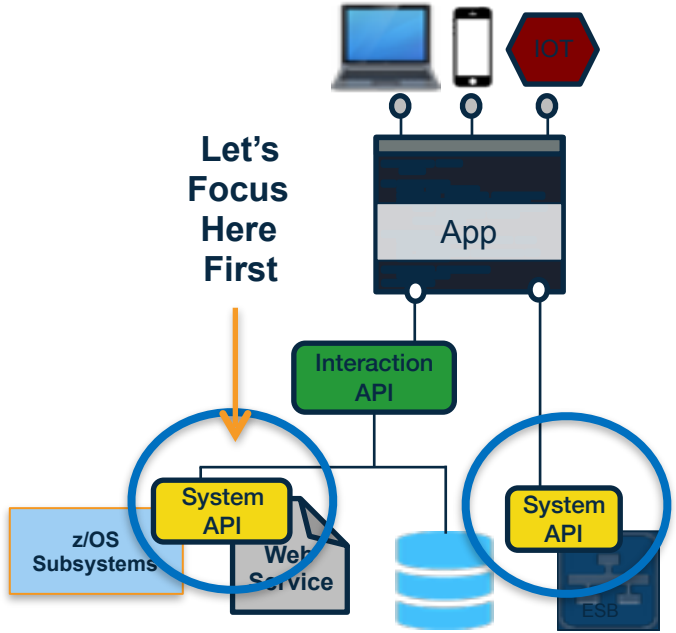
There are two types of API's

System APIs:

- APIs that pass through data from a system of record "unchanged"

Interaction APIs:

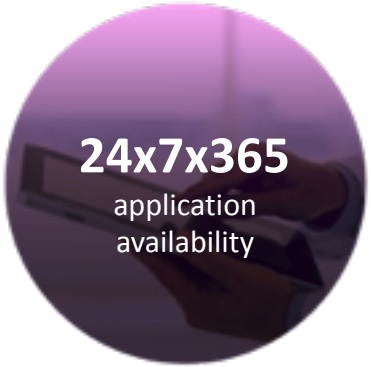
- Invoke one or more System API's or data sources, and manipulate the returned data *with new logic*
- Promote reuse across new applications



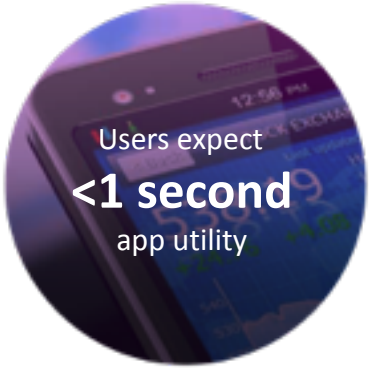
Part 2. z Systems relevance in the API economy

Client expectations remain daunting for enterprise apps

Availability



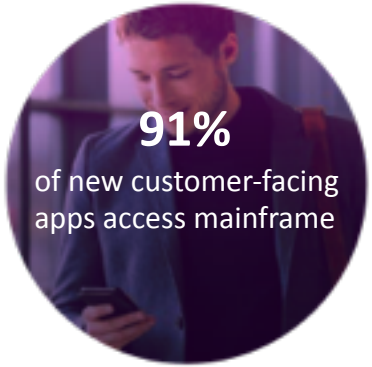
Response Time



Personalization

Trust

Integration



Scale

Good news! The mainframe can take on this challenge

- *Provides sub-second response time, even under extreme loads*
- *Enables in-transaction analytics*
- *Security – has earned the highest level of security certification*
- *Availability – 24x7x365*
- *Reliability – 99.999% uptime*
- *Scalability – best vertical scalability on the market to support millions of online users*

This is necessary, but not sufficient…..

Part 3. API Connect and z/OS Connect Enterprise Edition

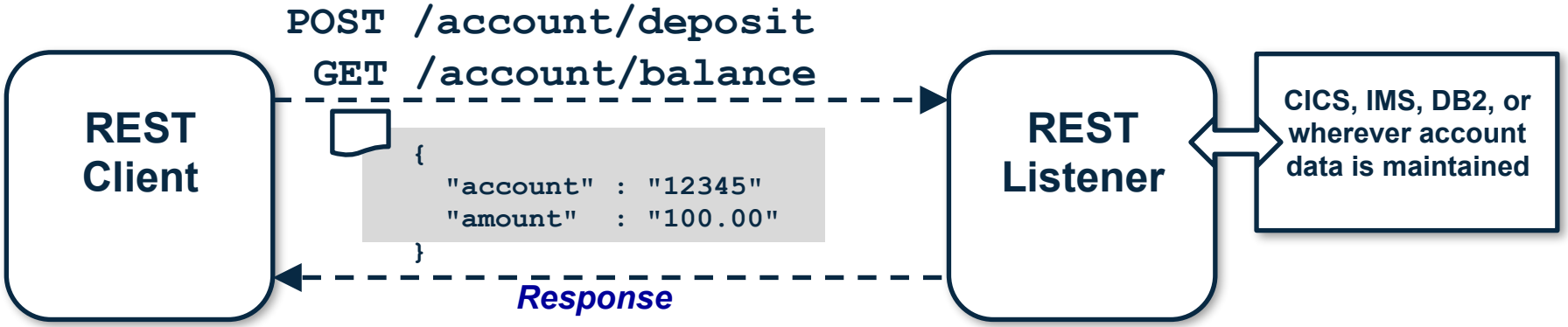
z/OS Connect Enterprise Edition (EE) V2.0

- **Provides "System APIs" creation for z/OS subsystem applications**
- **Integrates with "IBM API Connect" (more on this later)** for enterprise-class API management
  - Create, Run, Secure
- **Delivers RESTful APIs as a discoverable, first-class resource with OpenAPI Spec (Swagger 2.0) descriptions**
  - Ready for consumption by today's enterprise application developers and integration with API management solutions
- **Comprehensive tooling that enables API developers to create RESTful APIs from z/OS-based assets**
- **Supports standard JSON message format** and conversion to z/OS subsystem backend format requirements

Announce Dec 1, 2015

GA Dec 11, 2015

Simplified Overview of REST/JSON

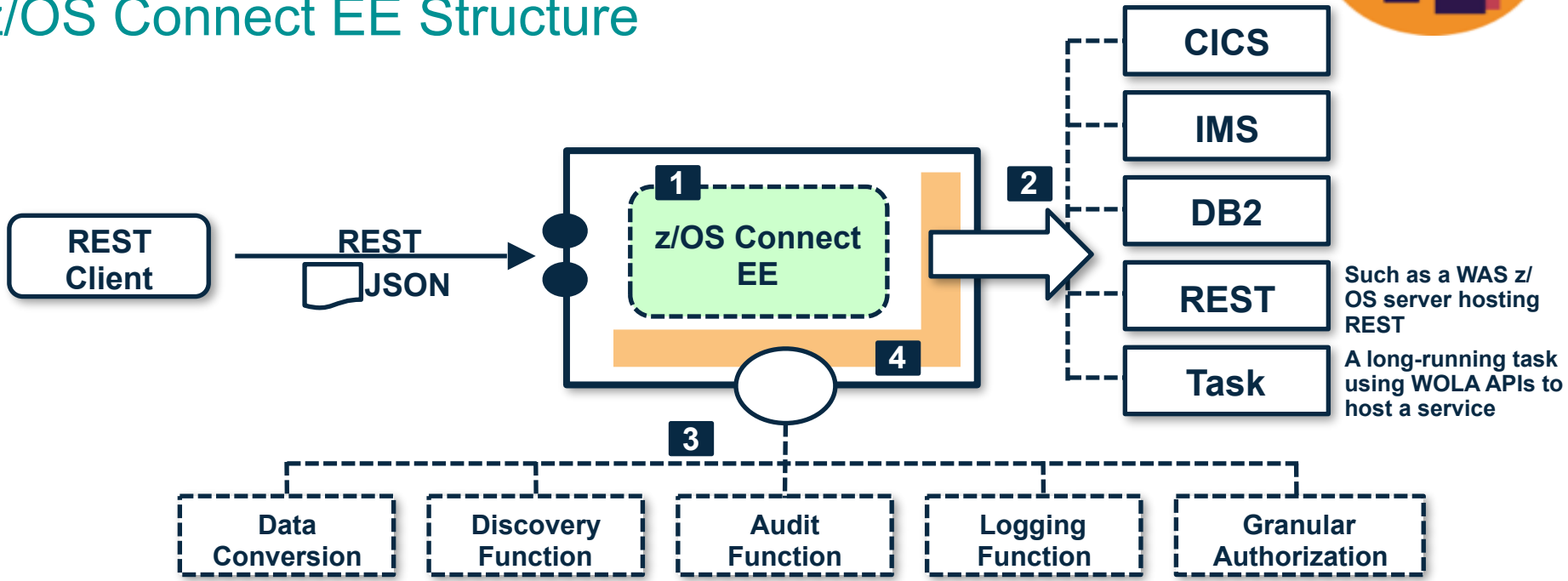


REST - “Representational State Transfer” ... which uses HTTP and HTTP verbs to allow a client to interact with a server over the TCP/IP network.

JSON - “JavaScript Object Notation” ... a name/value pair representation of data that is relatively lightweight and generally simpler to handle and parse than XML.

REST is increasingly popular as an integration pattern because it is stateless, relatively lightweight, is relatively easy to program

z/OS Connect EE Structure



1. z/OS Connect EE a Java servlet
2. "Service Provider" = backend connectivity
3. "Interceptors" = configurable function
4. Extensible interface = flexibility

http://www-03.ibm.com/software/products/en/zos-connect-enterprise-edition

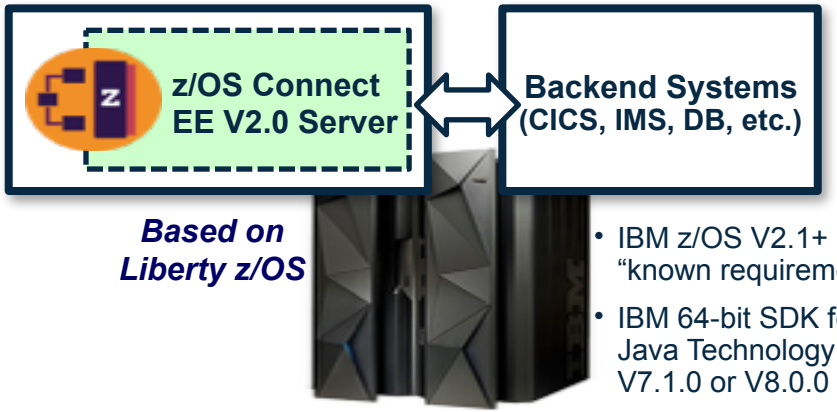
Four categories of new capabilities over prior z/OS Connect

- Full REST support
- Tooling for API creation and data mapping
- Support for API description using OpenAPI Spec (Swagger) 2.0
- API deployment support

High-Level Overview of z/OS Connect EE V2.0

Runtime Server 1

- Hosts APIs you define to run
- Connects with backend system
- You may have multiple instances



- IBM z/OS V2.1+ (V1R13 "known requirement")
- IBM 64-bit SDK for z/OS, Java Technology Edition V7.1.0 or V8.0.0

- IBM CICS Explorer V5.3
- IBM IMS Explorer for Development V3.2
- IBM Explorer for z/OS Aqua V3.0

Tooling Platform 2

- Integrates with an Eclipse environment
- Define APIs
- Define data mapping
- Deploy APIs to runtime server
- Export API archive for other tools to deploy

RESTful Support

z/OS Connect EE V2.0:

POST /account?name=Fred +  *(JSON with Fred's information)*

GET /account?number=1234

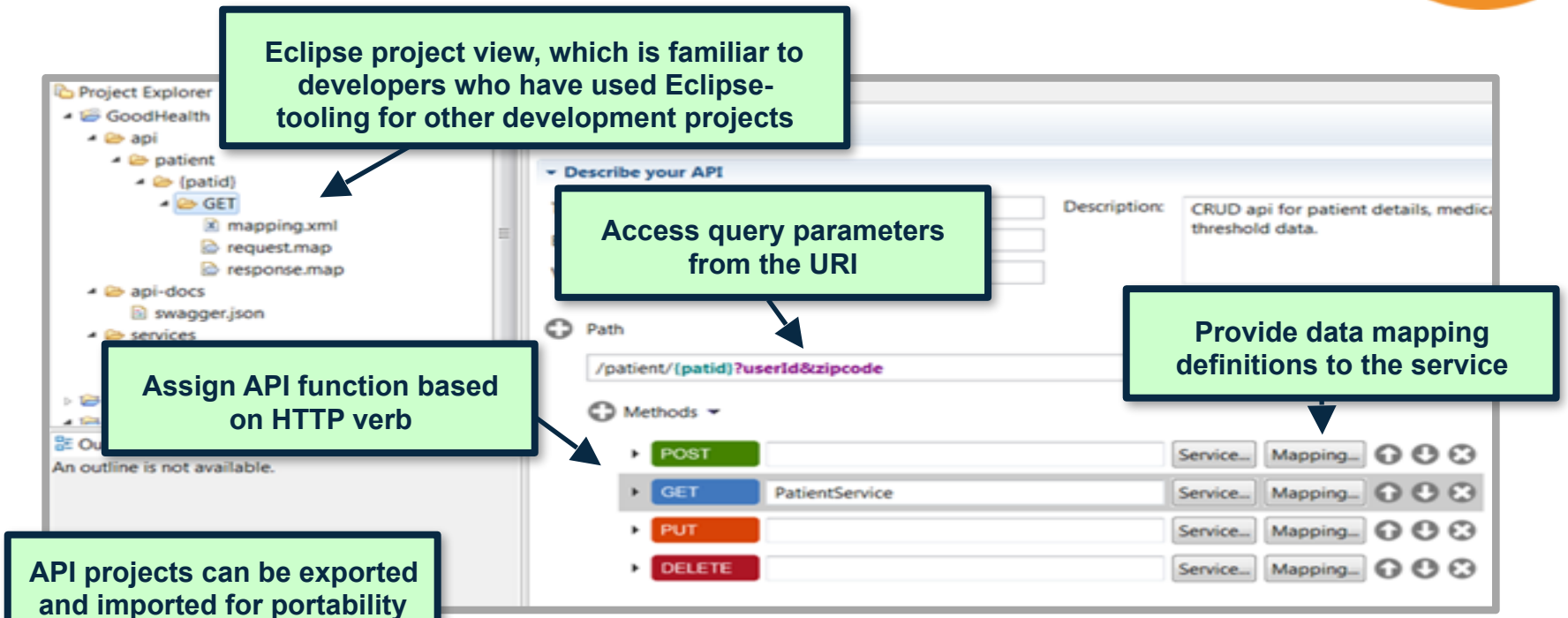
PUT /account?number=1234 +  *(JSON with dollar amount of deposit)*

HTTP Verb conveys the method against the resources; i.e., POST is for create, GET is for balance, etc.

URI conveys the resource to be acted upon; i.e., Fred's account with number 1234

The JSON body carries the specific data for the action (verb) against the resource (URI)

Eclipse-based Tooling for z/OS Connect EE V2.0

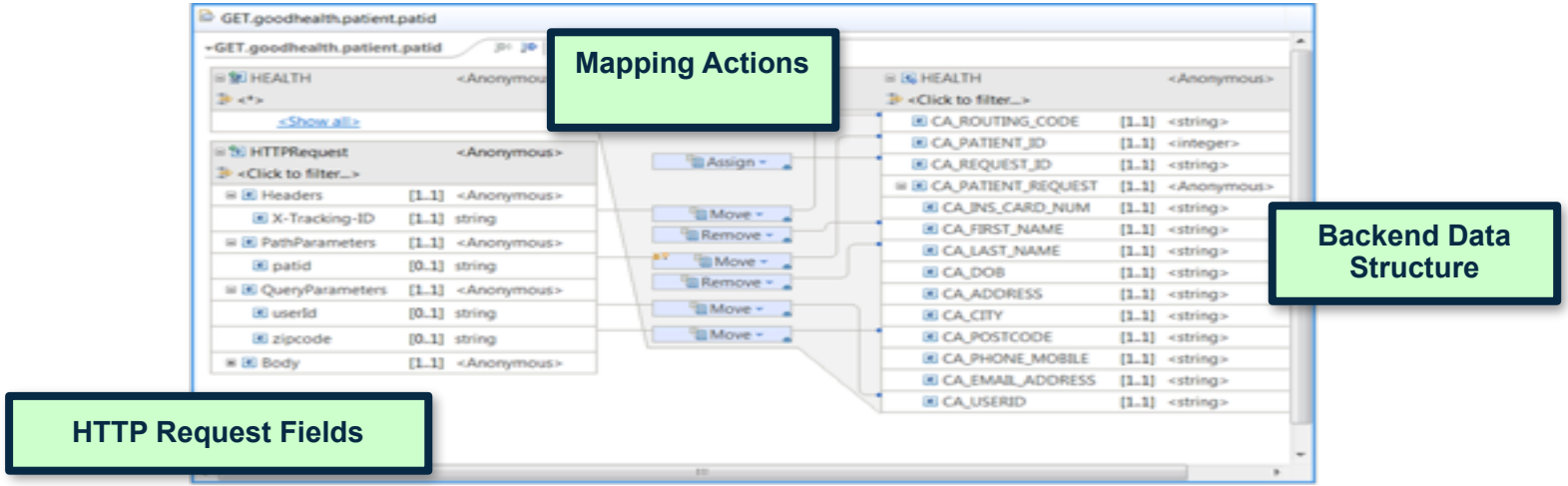


API definitions are created through the tool, which is consistent across backend systems (CICS, IMS, etc.)

YouTube Demo: https://youtu.be/HjE8wdvX3I0

Request Mapping Capabilities

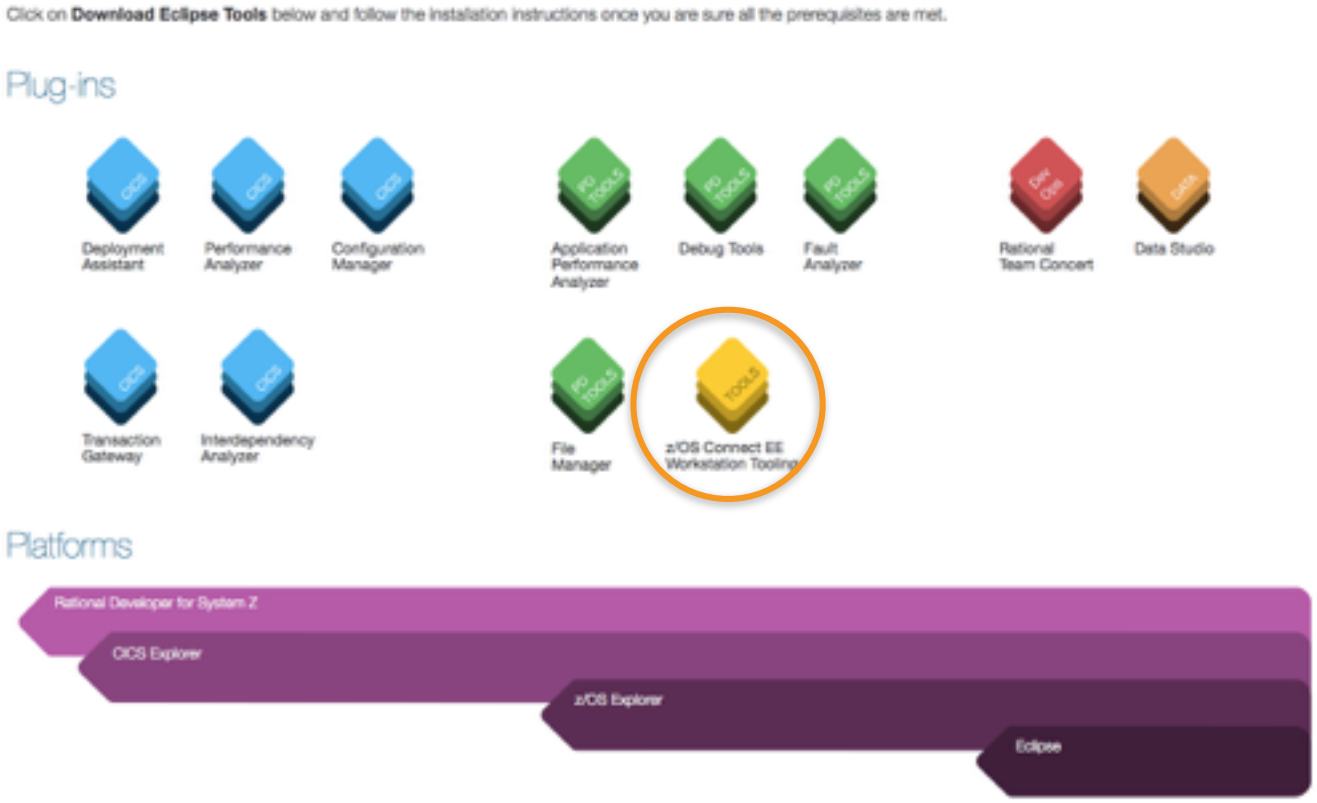
The API mapping model adds a powerful abstraction layer between the API consumer and the underlying z/OS assets.



- Mapping of HTTP headers, path parameters (URI templates), and query parameters to the fields in the request message JSON body.
- Pass-through, redaction, or defaulting of fields in the request or response message JSON body.
- Mapping and defaulting of HTTP headers in the HTTP response message.

IBM z/OS Connect Enterprise Edition V2.0

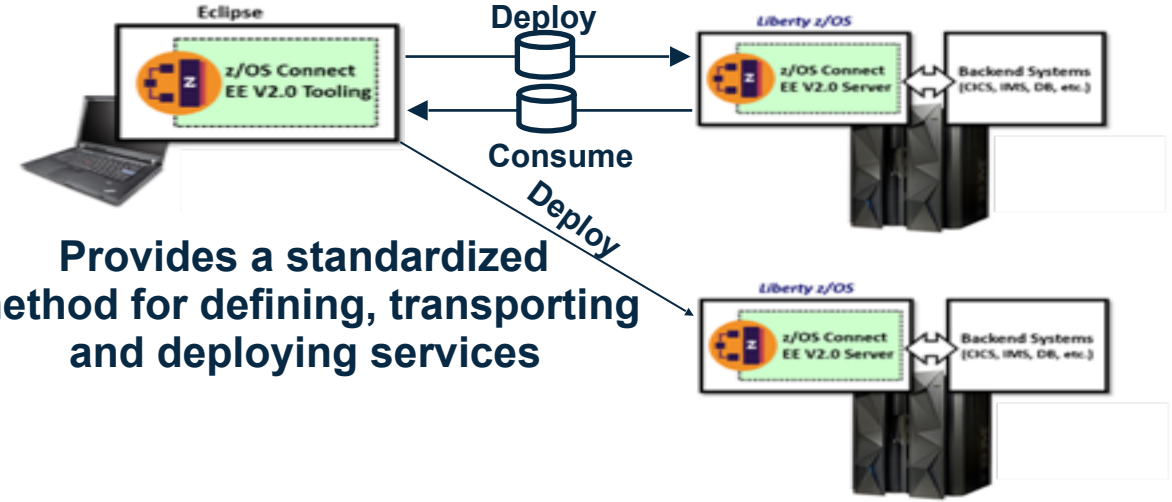
https://developer.ibm.com/mainframe/



API Archive (AAR) -- API Packaging

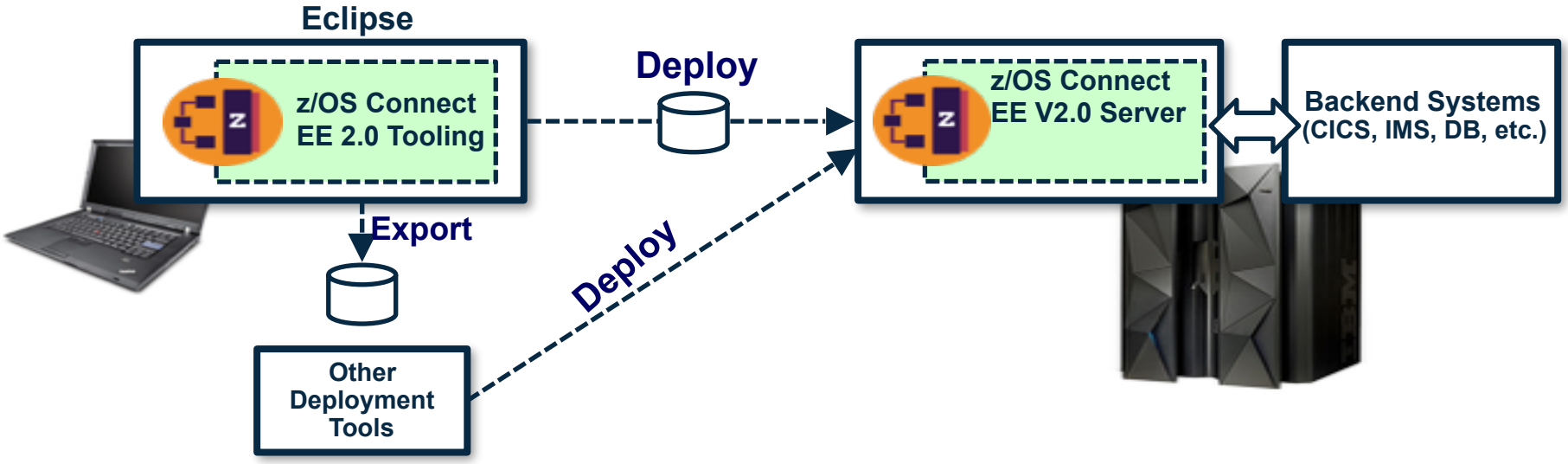
API Archive (AAR) File

- ZIP-format file
- Contains Swagger documentation of service
- Contains JSON schema and API information
- Produced by tooling
- Exportable to server runtime | Consumable by tooling



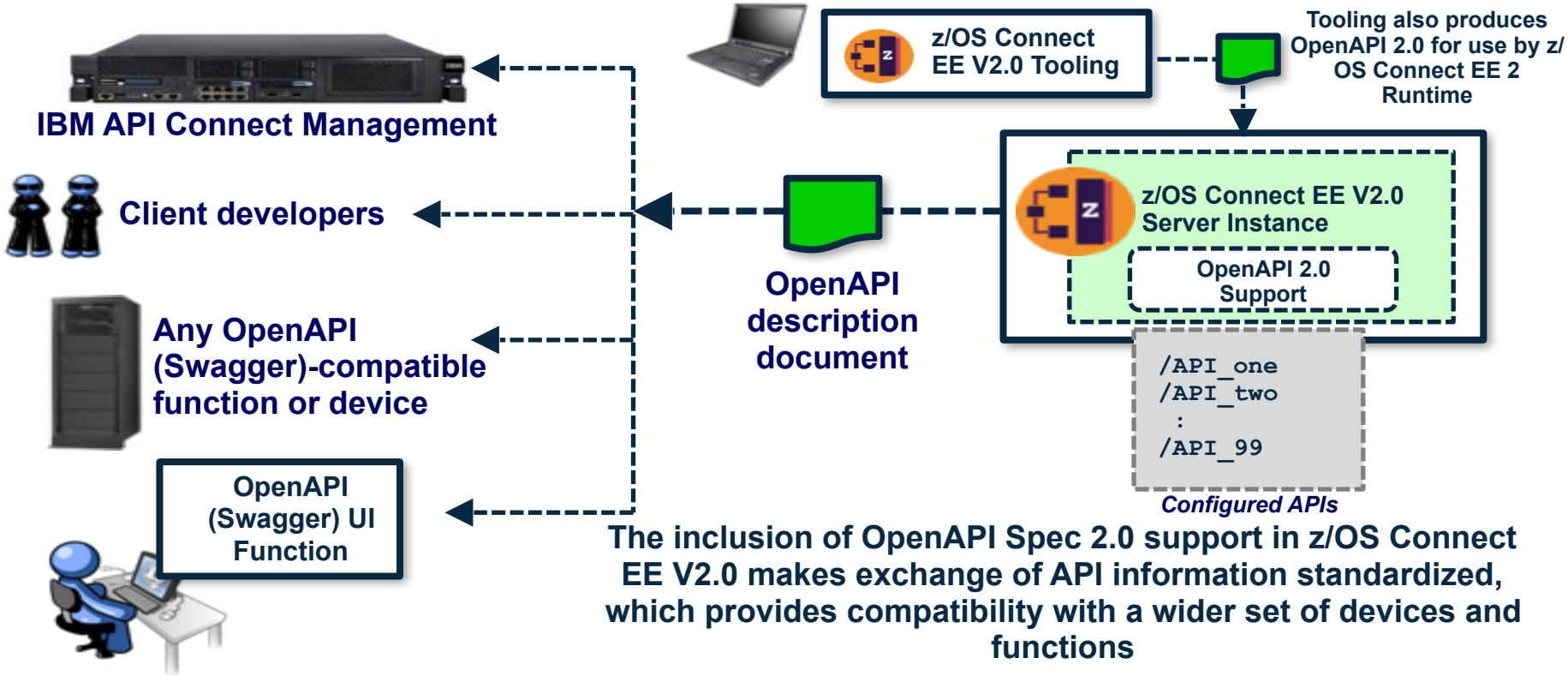
Provides a standardized method for defining, transporting and deploying services

Deployable Artifact and Automated Tools



Because the service definitions have been encapsulated into a deployable unit, it becomes eligible for deployment by automated tools. This further enhances productivity.

Discoverable APIs with OpenAPI Spec (Swagger) 2.0

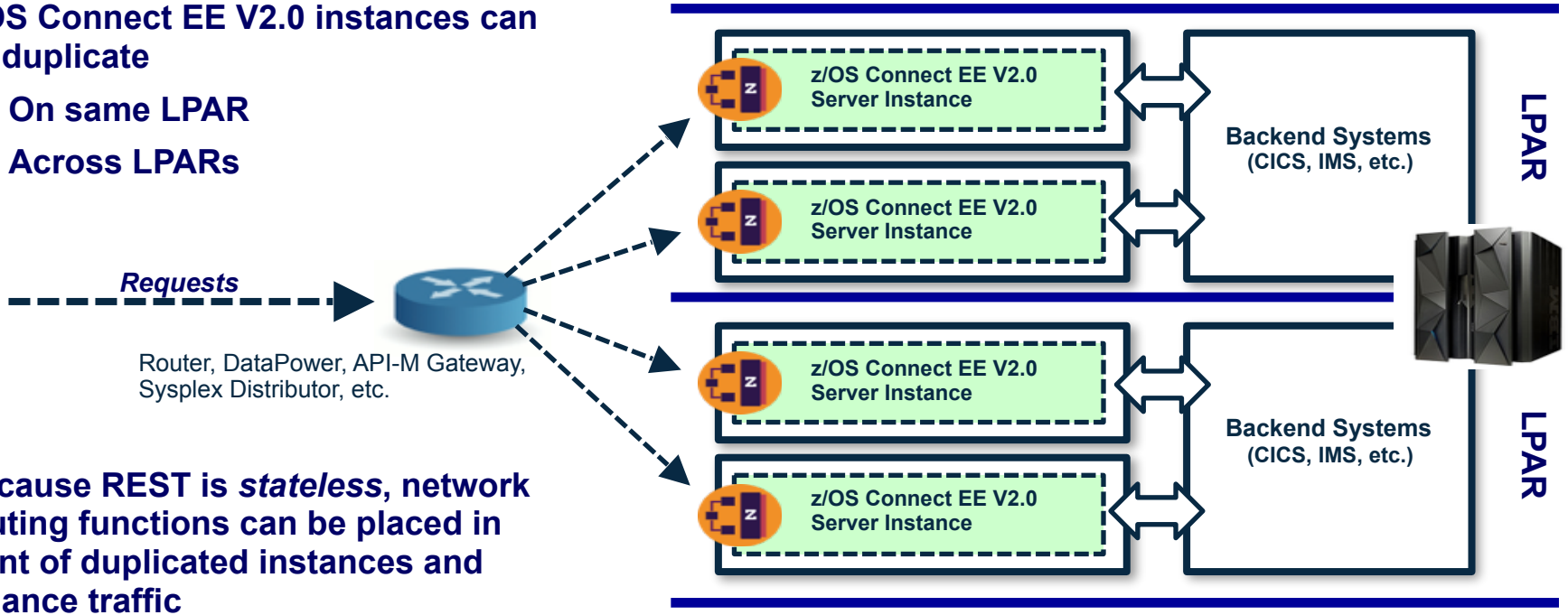


The inclusion of OpenAPI Spec 2.0 support in z/OS Connect EE V2.0 makes exchange of API information standardized, which provides compatibility with a wider set of devices and functions

Achieving a Highly Available Environment

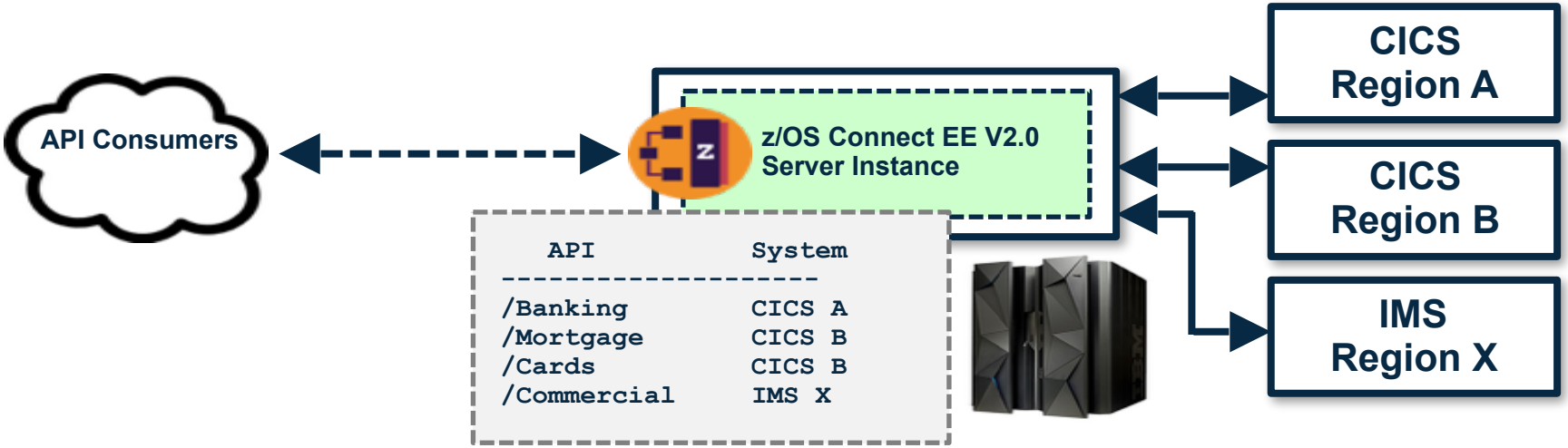
z/OS Connect EE V2.0 instances can be duplicate

- **On same LPAR**
- **Across LPARs**



Because REST is *stateless*, network routing functions can be placed in front of duplicated instances and balance traffic

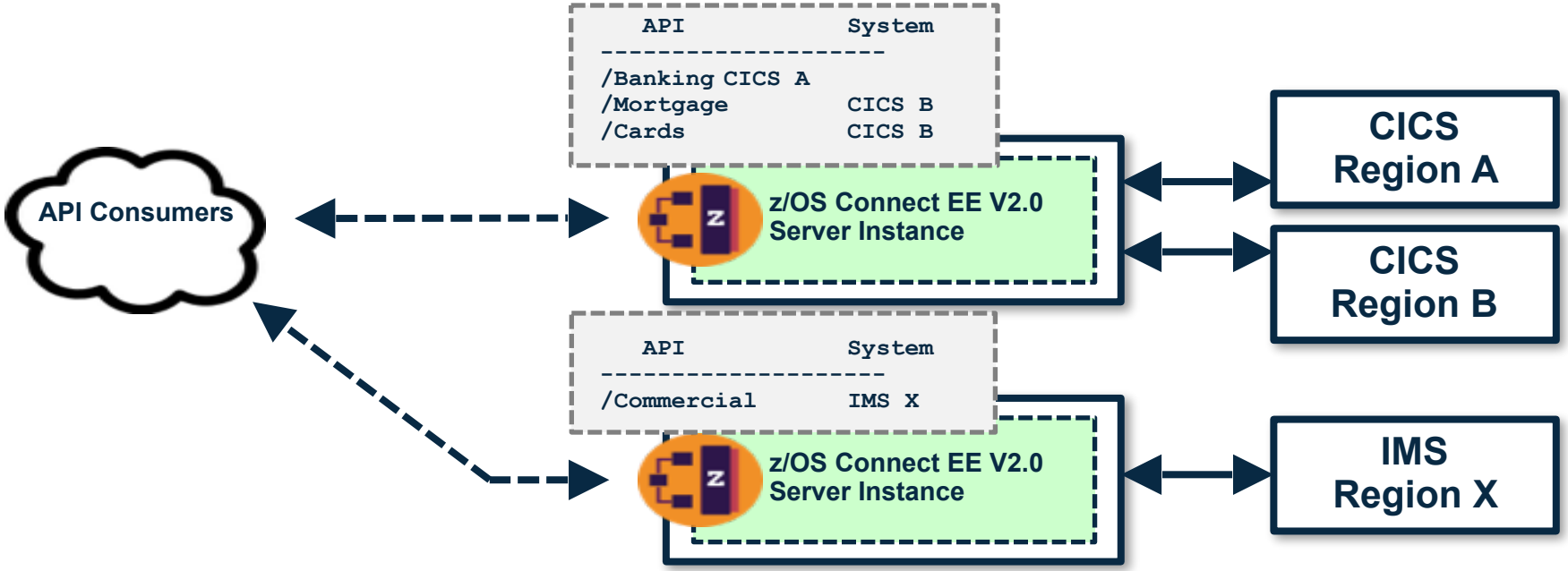
Support for Concurrent Multiple Backend Systems



z/OS Connect EE V2.0 becomes the REST API entry point to the LPAR for access to several backend systems where the data program resides

Duplicate the z/OS Connect EE V2.0 instance for greater availability and/or greater throughput

Multiple Server Instances for Different Lines of Business



There are times where the business requires operational separation and isolation. In that case, multiple instances of z/OS Connect EE V2.0 applies.

IBM z/OS Connect Enterprise Edition V2.0

IBM API Connect

IBM API Secure Gateway

z/OS Connect EE V2.0

CICS hosting SOAP or REST API

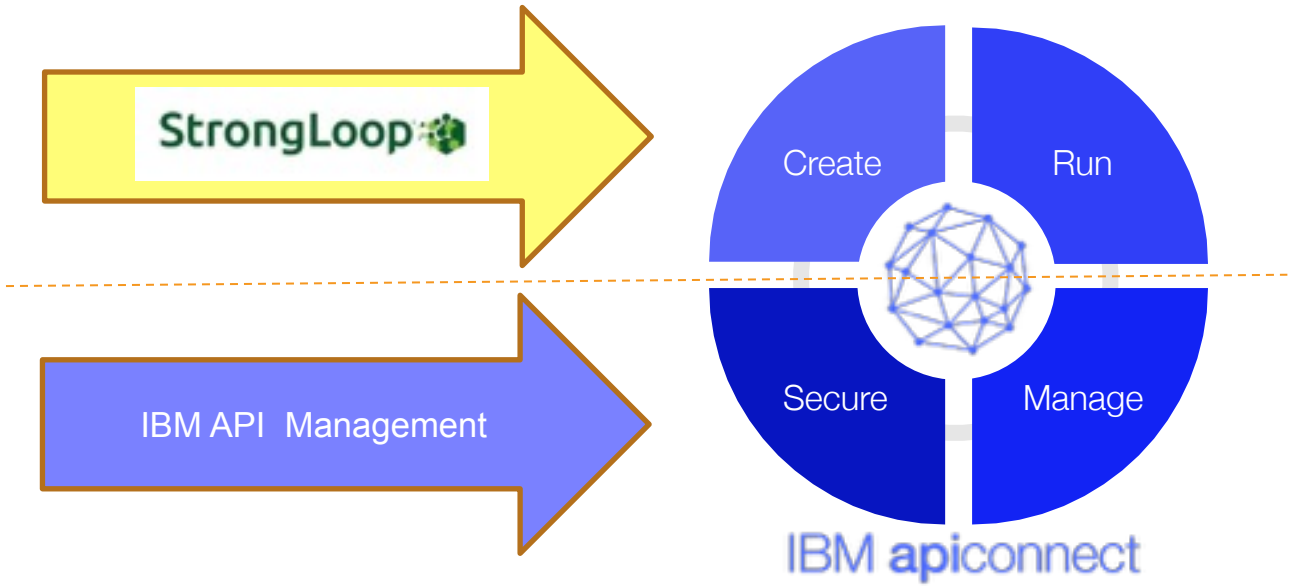
IMS hosting SOAP or REST API

Other SOAP or REST API function

As the number of APIs grows, the need to systematically manage the APIs becomes apparent. API Connect provides a way to improve business value of APIs created

To Build Interaction API's, and Manage, Secure and Run all your APIs:

API Connect V5.0



IBM API Connect V5

Simplified & Comprehensive API foundation

What is API Connect?

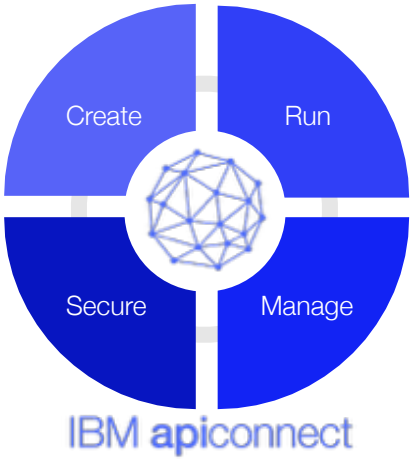
An integrated creation, runtime, management, and security foundation for enterprise grade API's and Microservices to power modern digital applications

Announce 2/16/2016

GA 3/15/2016

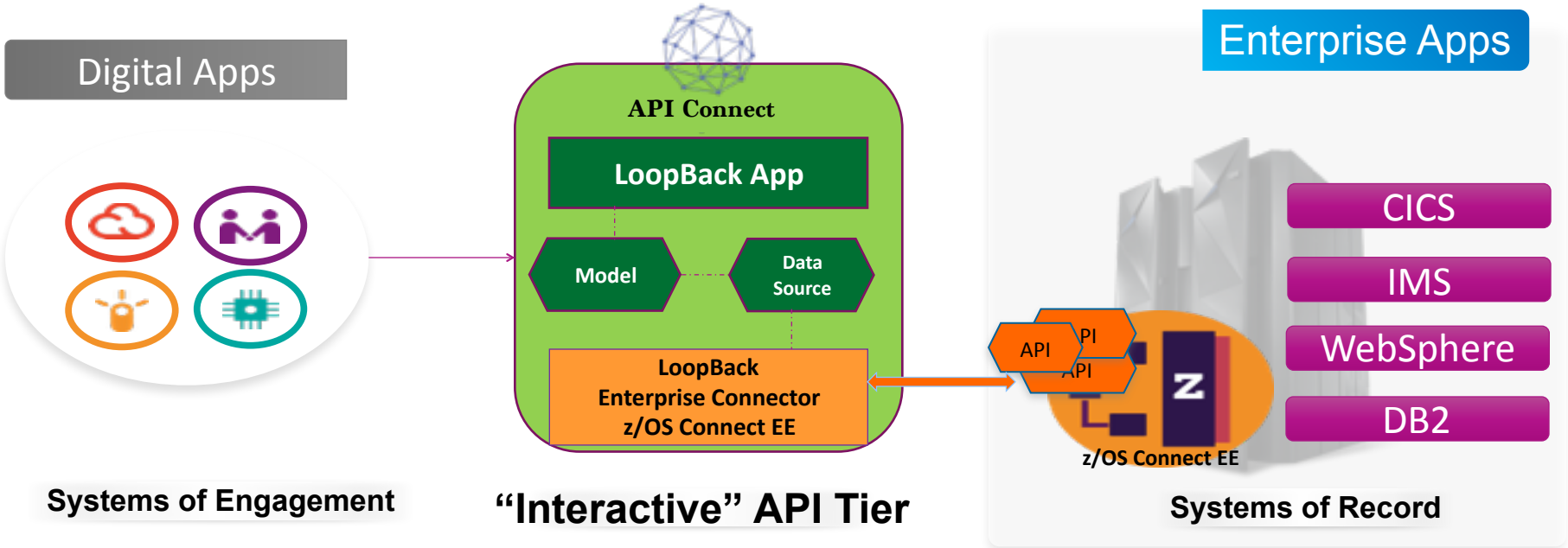
What does API Connect provide?

- Automated, visual and coding options for creating APIs
- Node.js and Java support for creating Microservices
- Integrated enterprise grade clustering, management and security for Node.js and Java
- Access control over API's, API Plans and API Products*
- Advanced API usage analytics
- Customizable, self service developer portal for publishing APIs
- Policy enforcement, security and control



**Clients who may have already created SOAP or REST services on z can still benefit from API Connect*

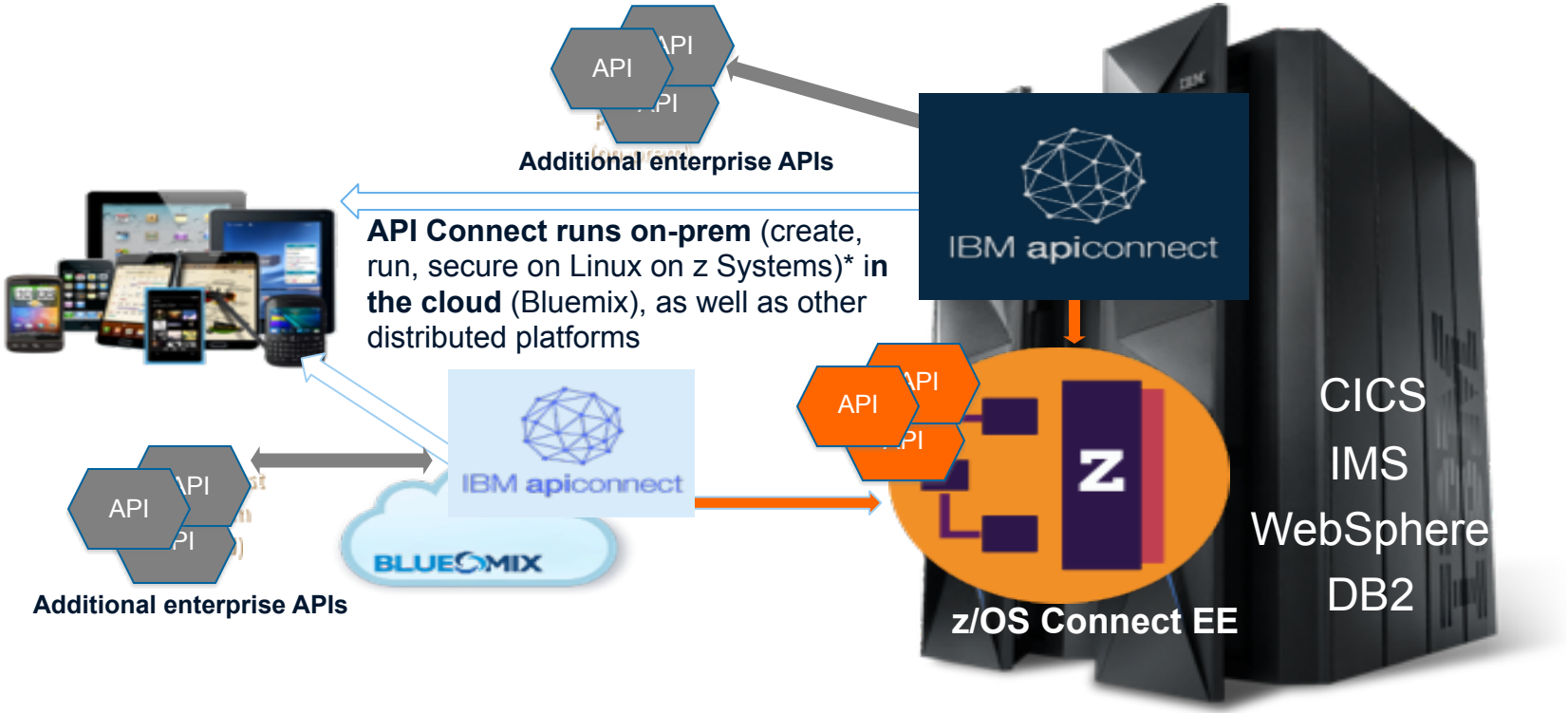
API Connect (includes StrongLoop)



LoopBack Connector and z/OS Connect EE

- A LoopBack model abstraction and associated API to work with in your NodeJS application
  - **Ease for developers** already working with LoopBack framework to connect with z/OS Connect Enterprise Edition endpoint using generated Model APIs.
- Customize the Model by extending and creating relations with other user defined models
  - **Ease of building real-world applications** that often would require to work with multiple models and interact with multiple data sources
- Build micro services architecture with the ability to orchestrate or mash-up hybrid backend services
  - **Ease of using Model abstraction** with business logics deployed in the LoopBack environment
- **Swagger documentation** for generated Models / APIs

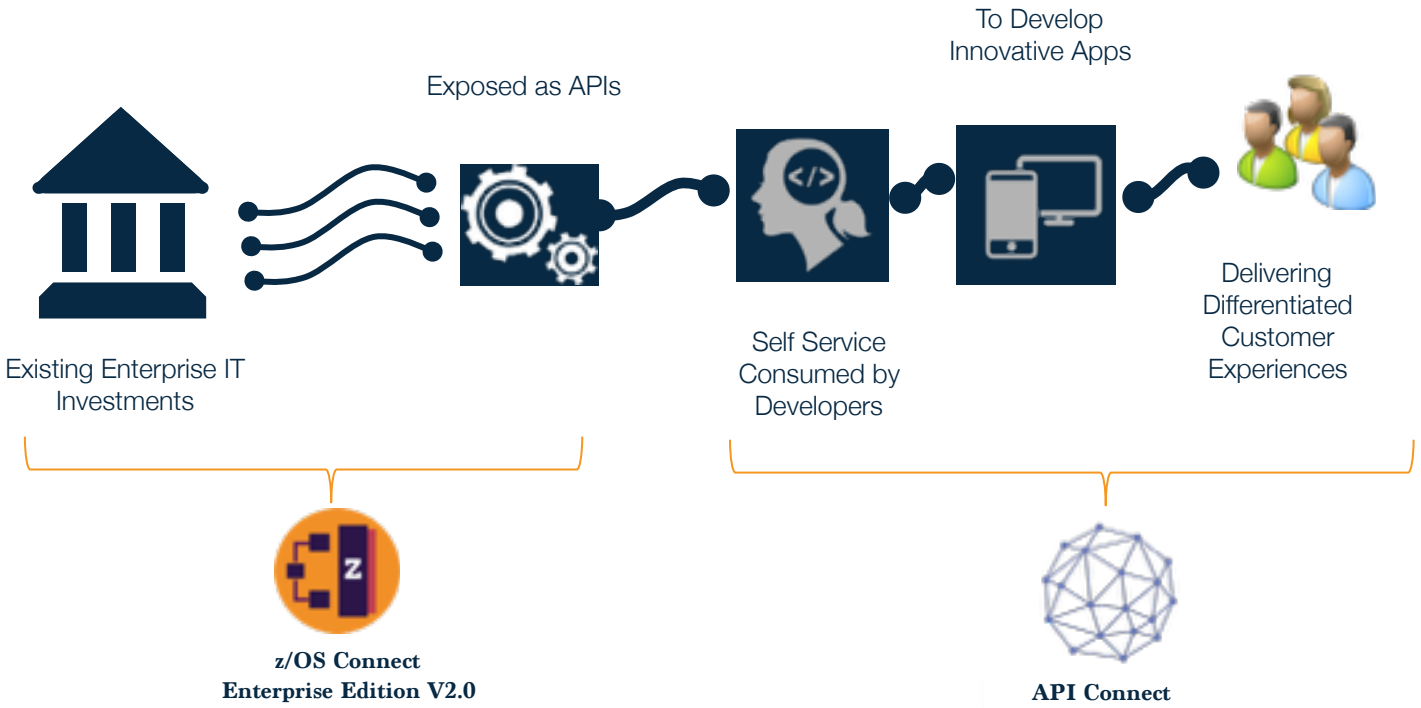
z/OS Connect EE along with API Connect provides optimized infrastructure to meet the demands of the API Economy



*The Datapower Manage component does not run on Linux on z Systems

Designed to work together…

Unleash Enterprise Investments to Disrupt Competitors



API Connect and z/OS Connect Enterprise Edition

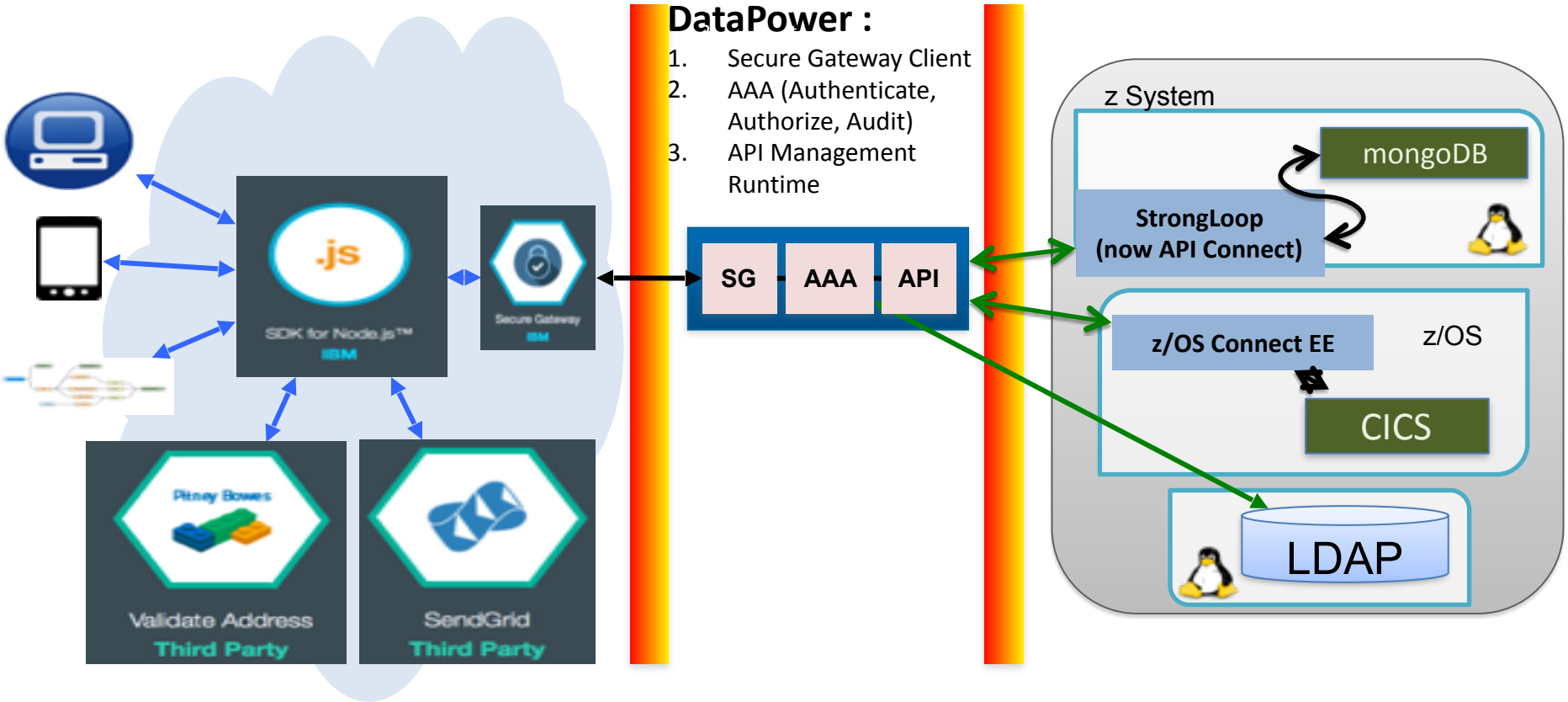
- Create APIs and microservices that consume z Systems APIs
- Manage and secure z System APIs created by z/OS Connect
  - ***Intend to support: connect to and discover z/OS Connect APIs and generate LoopBack models (1Q 2016)***

- Comprehensive tooling that enables API developers to create RESTful APIs from z/OS-based assets
- Delivers APIs as a discoverable resource using the OpenAPI specification (formerly swagger)
  - ***Intend to support: push APIs directly to API Connect catalog (2Q 2016)***

IBM apiconnect

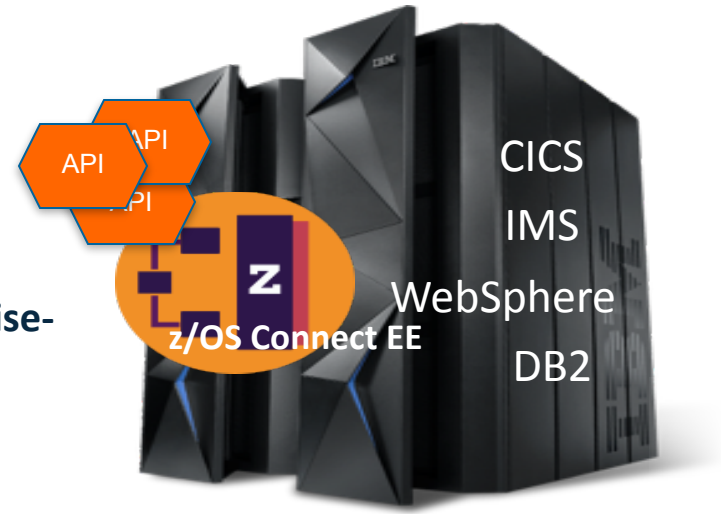
Part 4. Innovation on z Systems with access via APIs

Bluemix application architecture



z/OS Connect Enterprise Edition (EE) V2.0

- **Delivers RESTful APIs as a discoverable, first-class resource with Swagger 2.0 descriptions**
  - **Ready for consumption by today's enterprise application developers and integration with API management solutions**
- **Comprehensive tooling that enables API developers to create RESTful APIs from z/OS-based assets**
- **Supports standard JSON message format**
- **Integrates with IBM API Connect (API Management) for enterprise-class API management**
  - **Consumer registration, API security controls, and version control.**



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