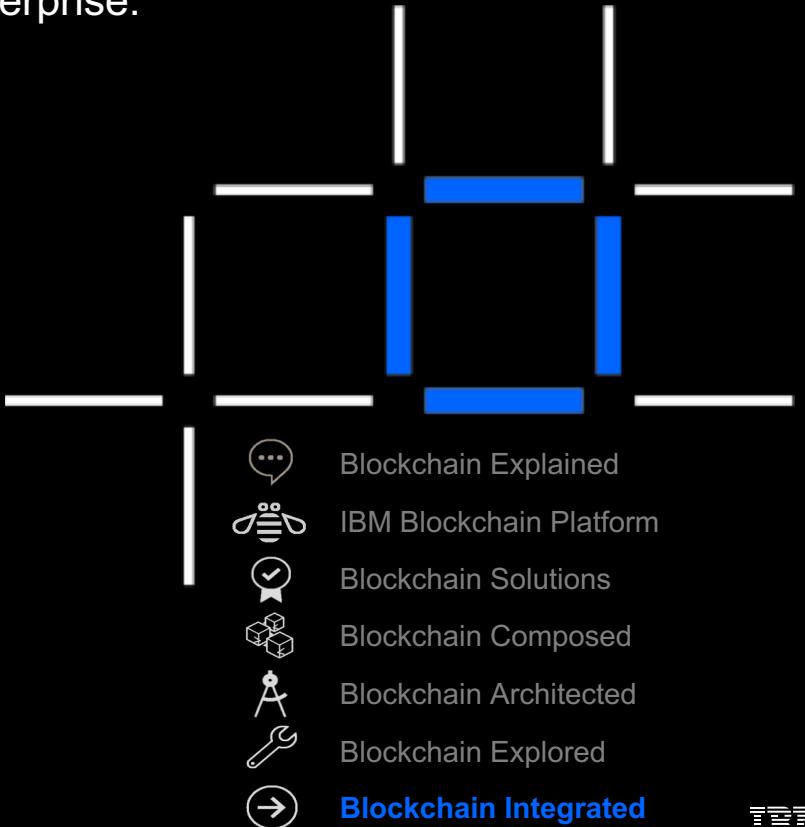


Blockchain Integrated

An Introduction to Blockchain Integration with your enterprise.

*Steven Bodie
Senior IT Specialist
IBM Hybrid Cloud Integration*





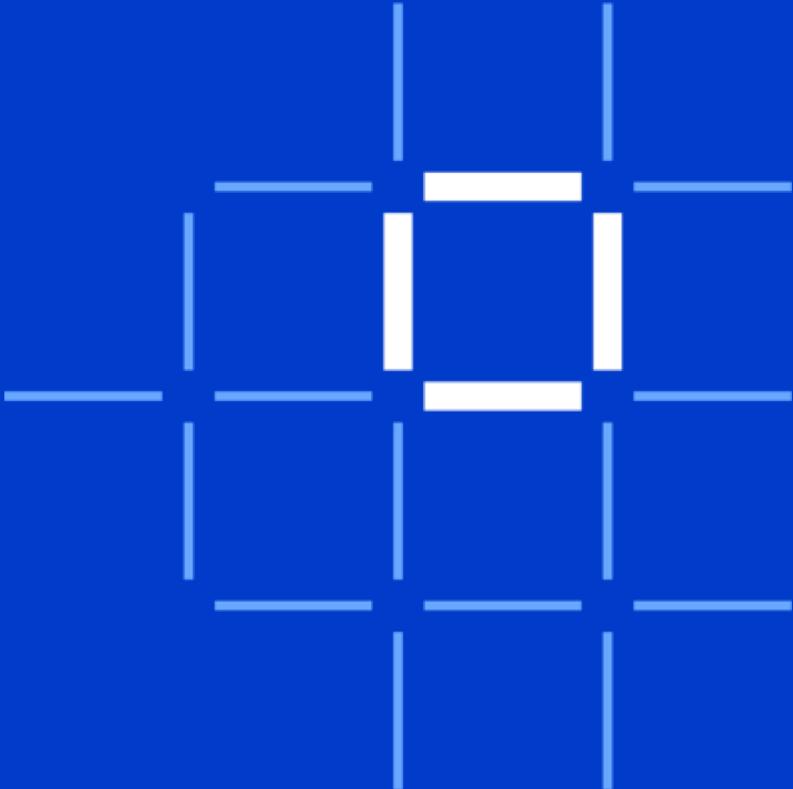
How do we integrate
with Blockchains?



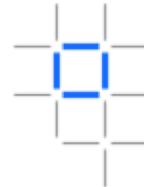
Composer REST APIs



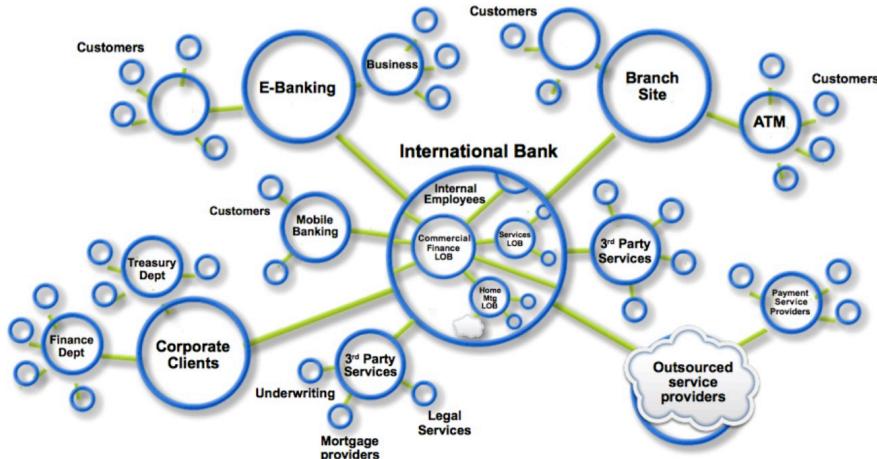
Publishing APIs to your
Developers



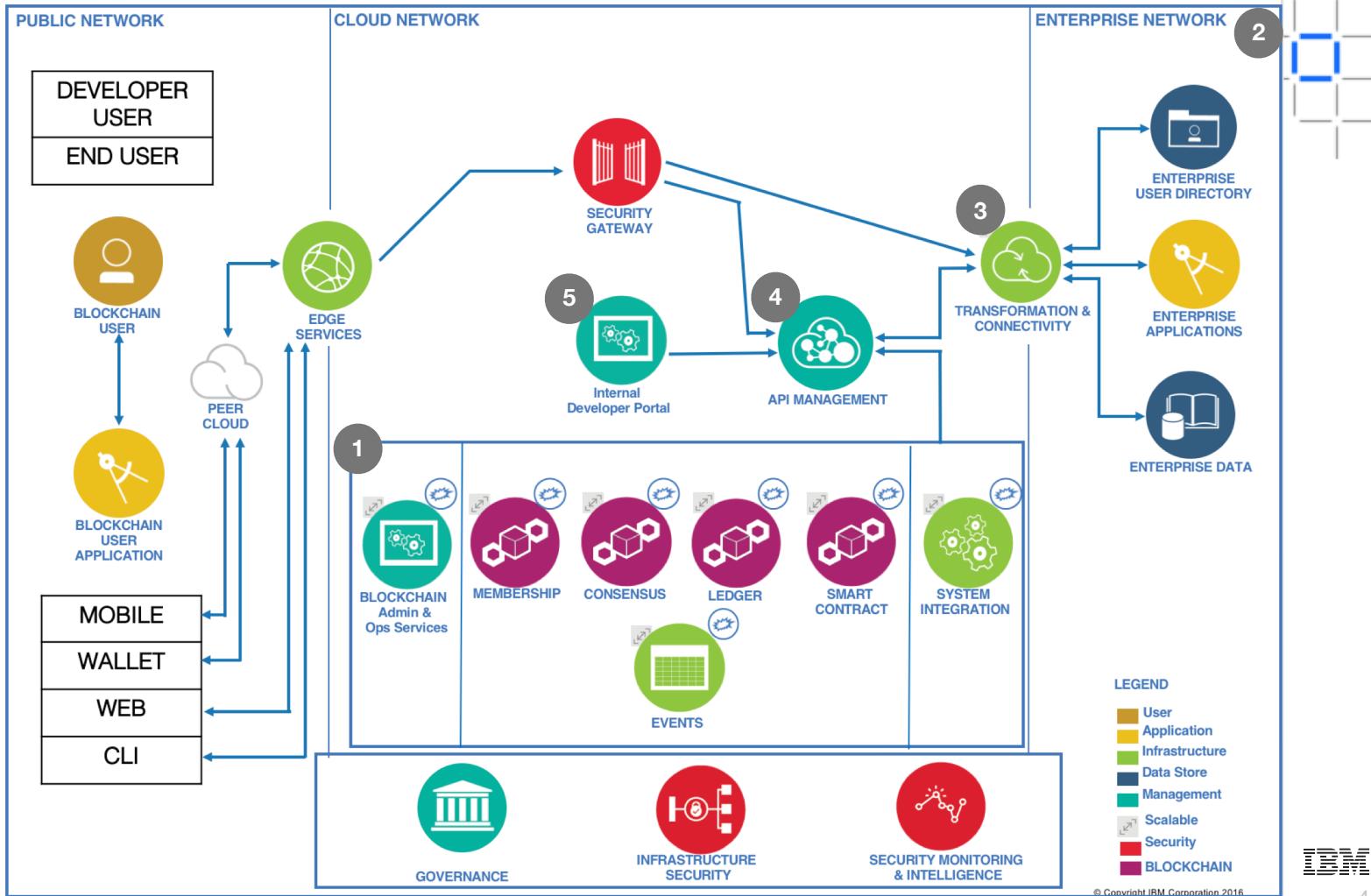
Integration should start simple



- **Distributed Ledger Technology (DLT)**
 - Gives us the opportunity to re-architect entire industries
- **Keep It Simple**
 - Radical changes are coming
 - But first we have to integrate with DLT and build an ecosystem
- **Less Data Movement** is more secure:
 - By accessing data directly we eliminate potential security risks of moving data.
 - Standardized RESTful API access is what developers want



Topology





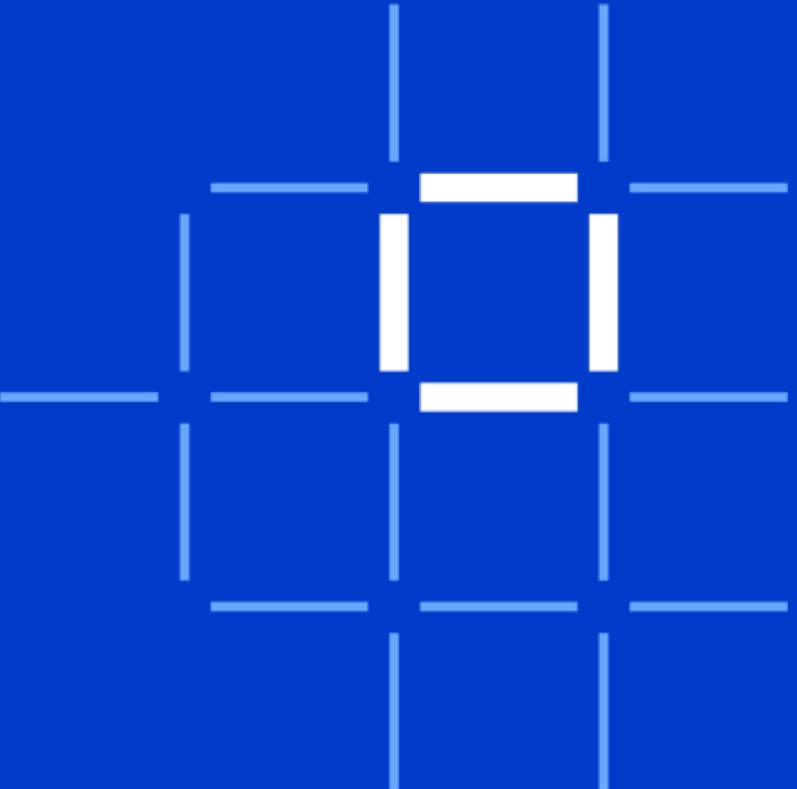
How do we integrate
with Blockchains?

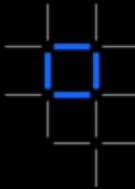


Composer REST APIs



Publishing APIs to your
Developers





How REST API's can give you the edge



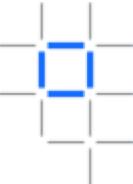
ibm_wsc_immunichain_addImmunizations : A transaction named addImmunizations[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)

GET	/ibm.wsc.immunichain.addImmunizations	Find all instances of the model matched by filter from the data source.
POST	/ibm.wsc.immunichain.addImmunizations	Create a new instance of the model and persist it into the data source.
GET	/ibm.wsc.immunichain.addImmunizations/{id}	Find a model instance by {{id}} from the data source.

ibm_wsc_immunichain_assignMedProvider : A transaction named assignMedProvider[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)

GET	/ibm.wsc.immunichain.assignMedProvider	Find all instances of the model matched by filter from the data source.
POST	/ibm.wsc.immunichain.assignMedProvider	Create a new instance of the model and persist it into the data source.
GET	/ibm.wsc.immunichain.assignMedProvider/{id}	Find a model instance by {{id}} from the data source.

ibm_wsc_immunichain_authMember : A transaction named authMember[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)**ibm_wsc_immunichain_Childform : An asset named Childform**[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)**ibm_wsc_immunichain_Guardian : A participant named Guardian**[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)**ibm_wsc_immunichain_MedProvider : A participant named MedProvider**[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)**ibm_wsc_immunichain_Member : A participant named Member**[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)**ibm_wsc_immunichain_reassignGuardian : A transaction named reassignGuardian**[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)**ibm_wsc_immunichain_removeMemberAuth : A transaction named removeMemberAuth**[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)**ibm_wsc_immunichain_updateChildForm : A transaction named updateChildForm**[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)**System : General business network methods**[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)

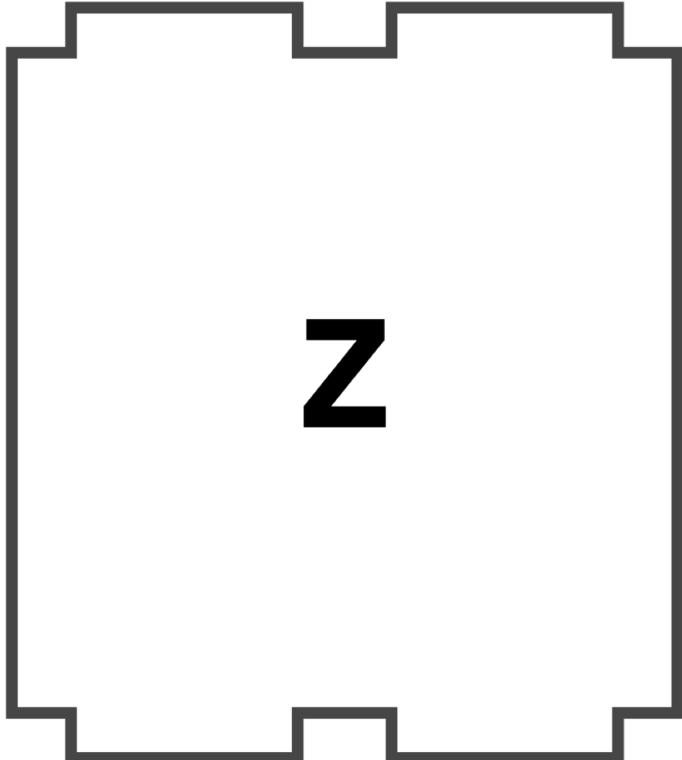
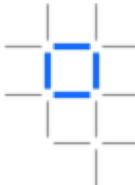


Open API 2.0 (Swagger)

```
{  
  swagger: "2.0",  
  info: {  
    version: "1.0.0",  
    title: "LoopBack Application"  
  },  
  basePath: "/api",  
  paths: {  
    /system/ping: {  
      get: {  
        tags: [  
          "System"  
        ],  
        summary: "Test the connection to the business network",  
        operationId: "System.ping",  
        parameters: [ ],  
        responses: {  
          200: {  
            description: "Request was successful",  
            schema: {  
              $ref: "#/definitions/PingResponse"  
            }  
          }  
        },  
        deprecated: false  
      }  
    },  
    /system/identities: {  
      get: {  
        tags: [  
          "System"  
        ],  
        summary: "Get all identities from the identity registry",  
        operationId: "System.getAllIdentities",  
        parameters: [ ],  
        responses: {  
          200: {  
            description: "Request was successful",  
            schema: {  
              type: "array",  
              items: {  
                type: "object"  
              }  
            }  
          }  
        }  
      }  
    }  
  }  
},
```

- An **API** description format for REST **APIs**.
- An OpenAPI file allows you to describe your entire API, including:
 - Available endpoints (/users) and operations on each endpoint (GET /users, POST /users)
 - Operation parameters Input and output for each operation
 - Authentication methods
 - Contact information, license, terms of use and other information.

What makes a good API host?



“Fast response time”.

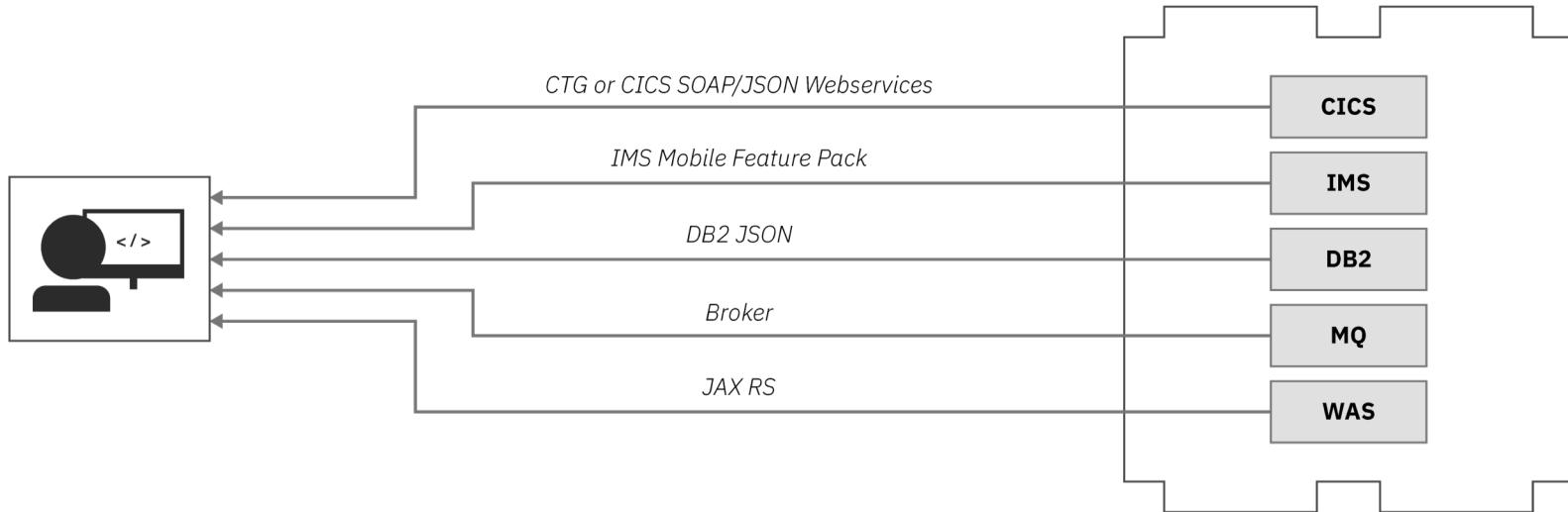
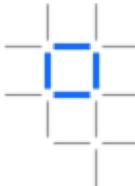
“Extremely reliable”.

“Handles high workloads”.

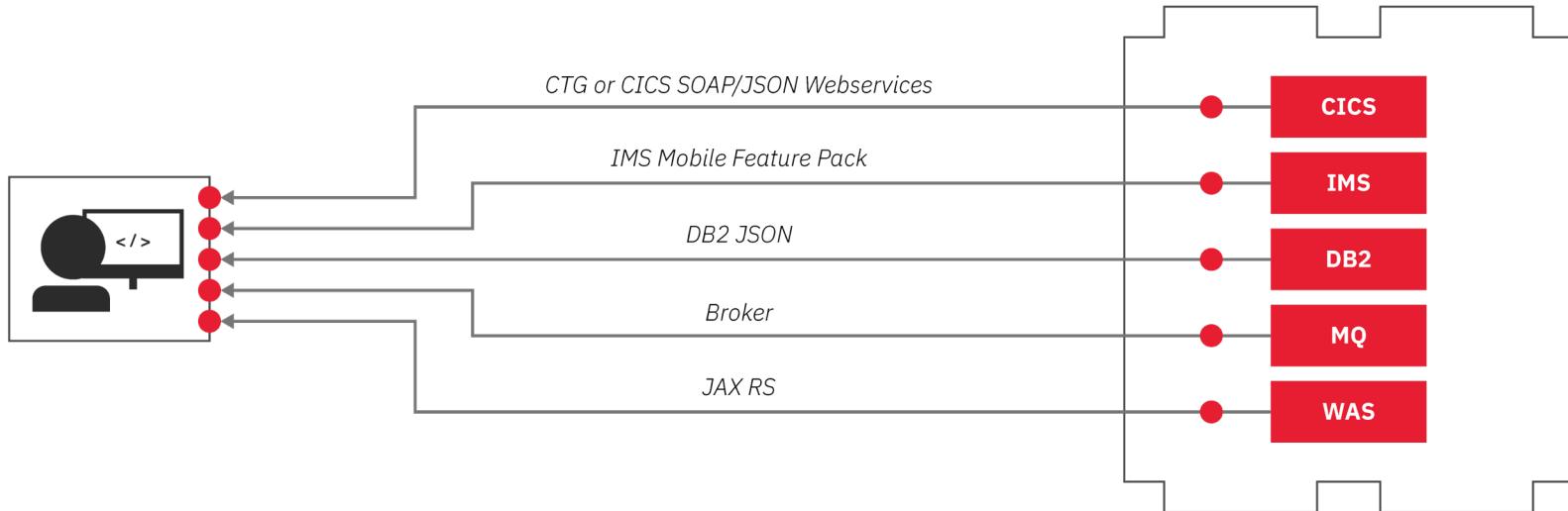
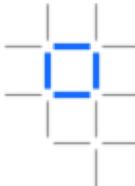
“Highly available”.

Z has all of these attributes, and it's where your core assets are.

Can we do this natively?



Can we do this natively?

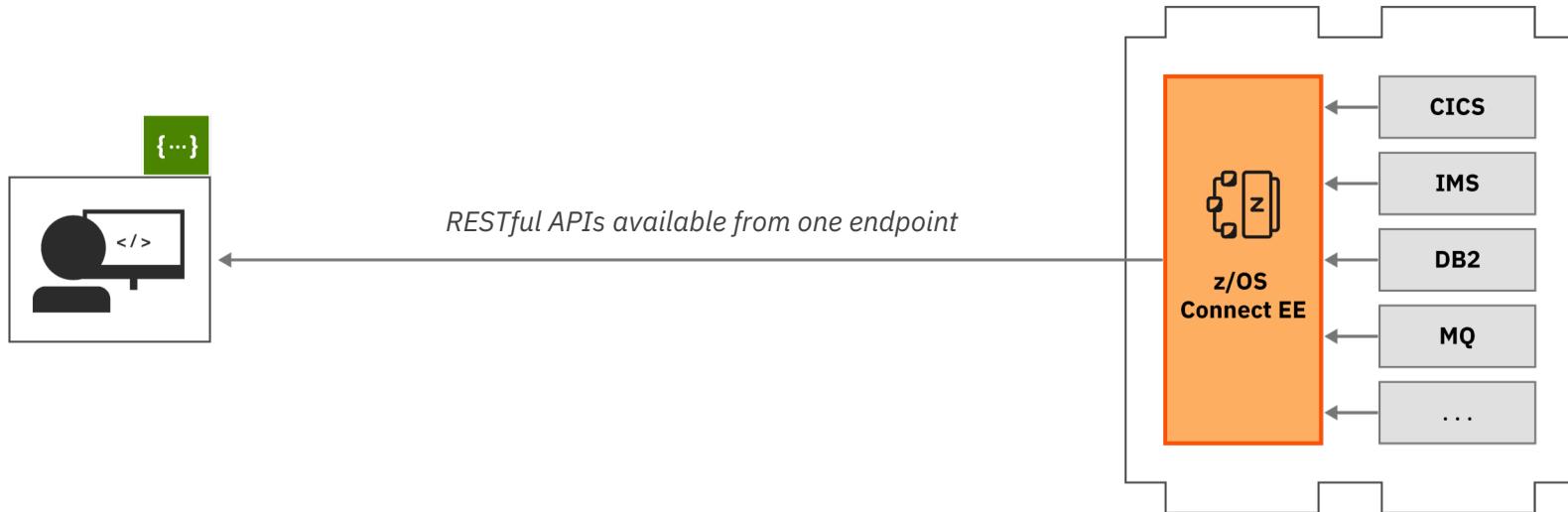
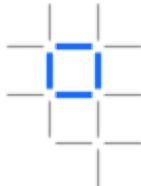


Completely different configuration and management.

Multiple endpoints for developers to call/maintain access to.

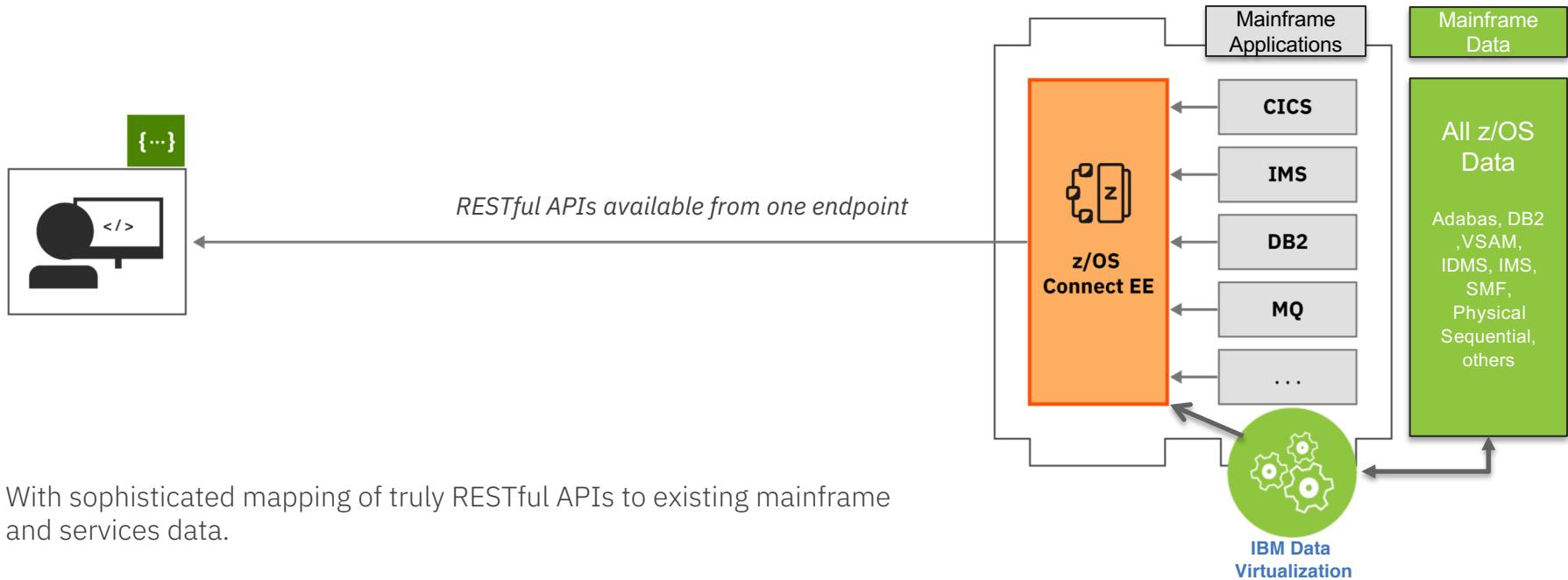
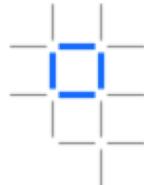
These are typically not RESTful!

You need a single point of entry



With sophisticated mapping of truly RESTful APIs to existing mainframe and services data.

You need a single point of entry, including data.





How do we integrate
with Blockchains?



Composer REST APIs



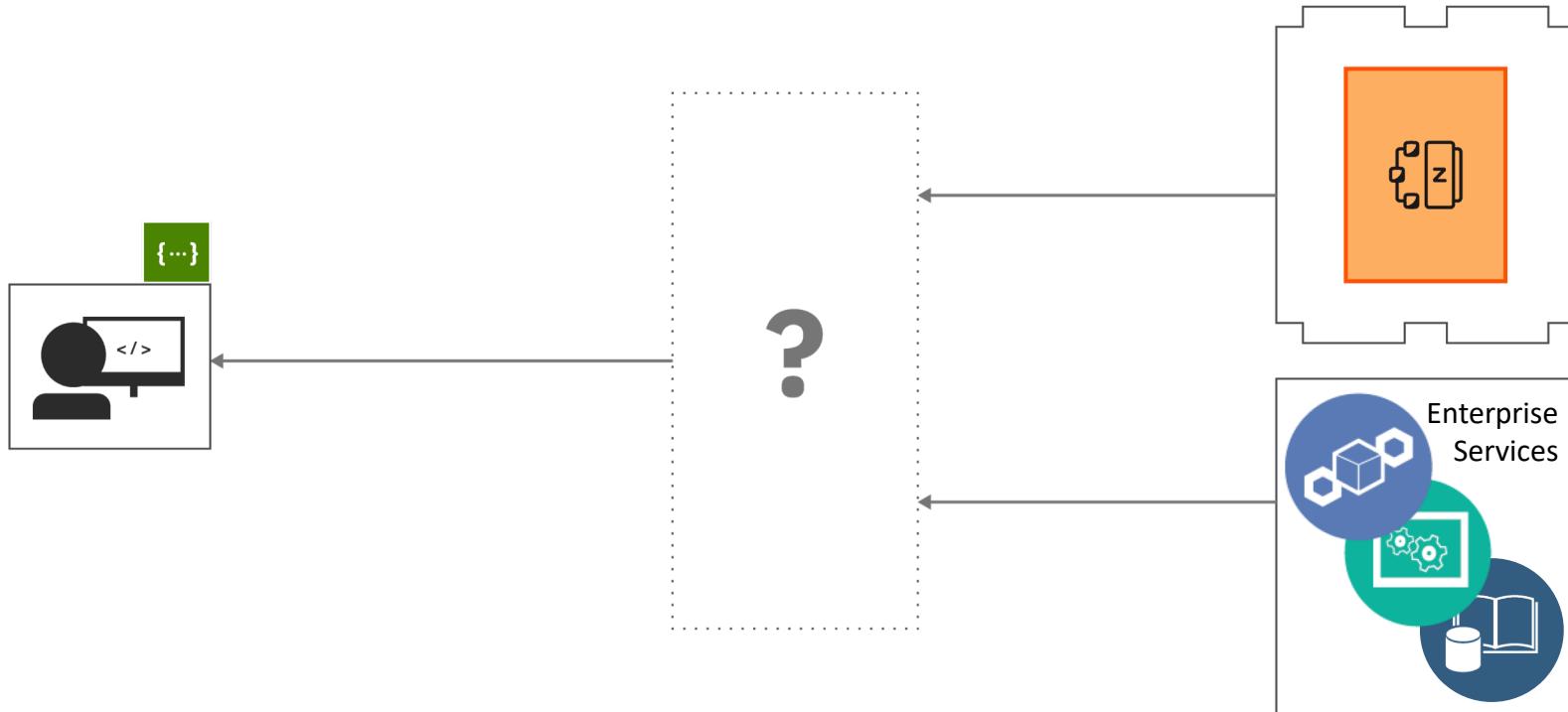
[Publishing APIs to your
Developers]





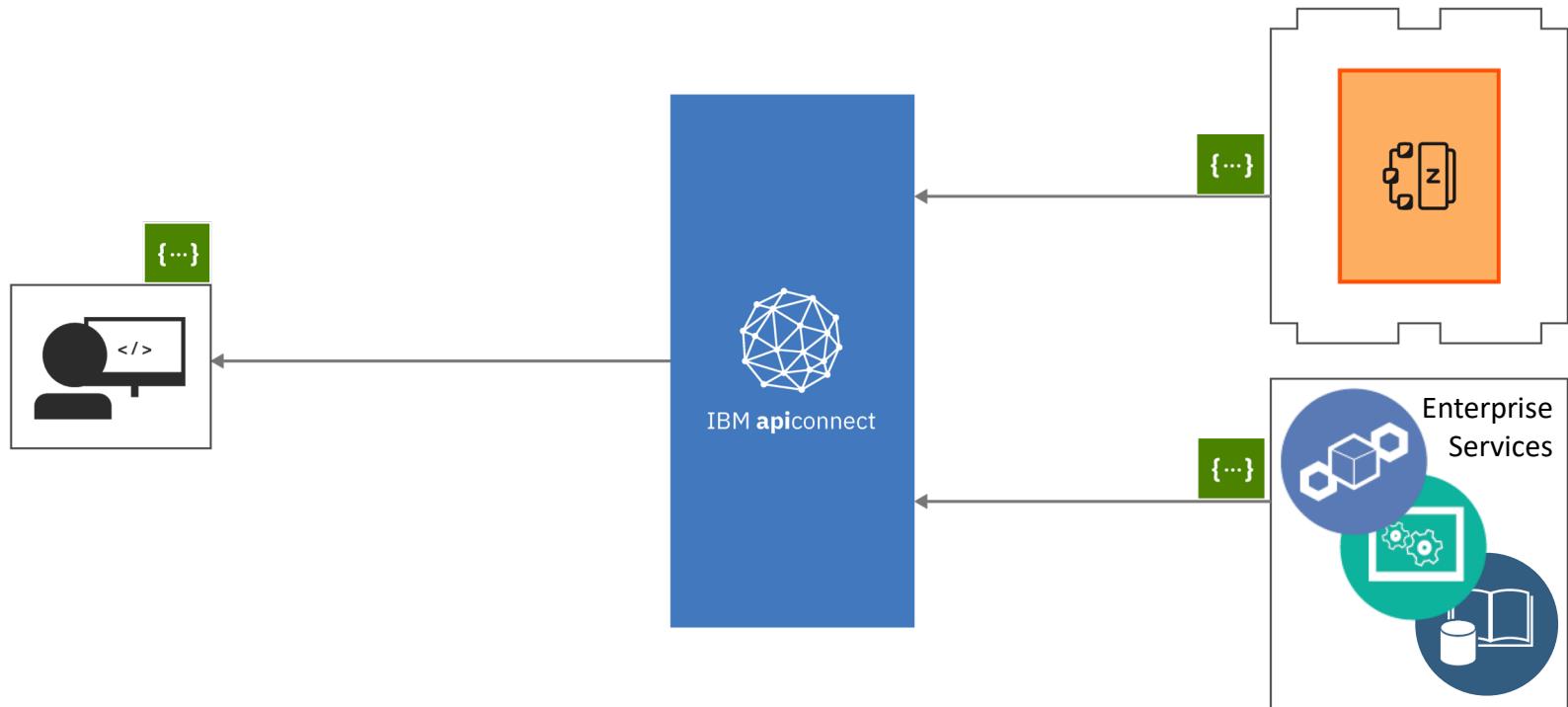
Publishing APIs

How do you publish your APIs to developers?



Publishing APIs

We need an API management gateway!



Pattern: IBM API Connect + IBM Blockchain Platform

IBM Blockchain Platform

Expose Hyperledger Composer REST APIs from the defined "Smart Contract" or business rules in the blockchain

What if the Smart Contract exposes a new version of those APIs? How do I control which blockchain applications are using which version of the APIs?

How do I prevent a rogue application from flooding the blockchain with transactions and queries?

How do I provide analytics on which blockchain APIs are being invoked by which applications?

How do I protect against malicious payloads in APIs?

IBM API Connect

...manages these APIs, possibly with different owners, workflow approvals, portals, etc.

... manages the API product subscriptions lifecycle

... enforces API traffic throttling with API subscription plans

... provides customizable analytics dashboards to track API traffic and the applications consuming those APIs.

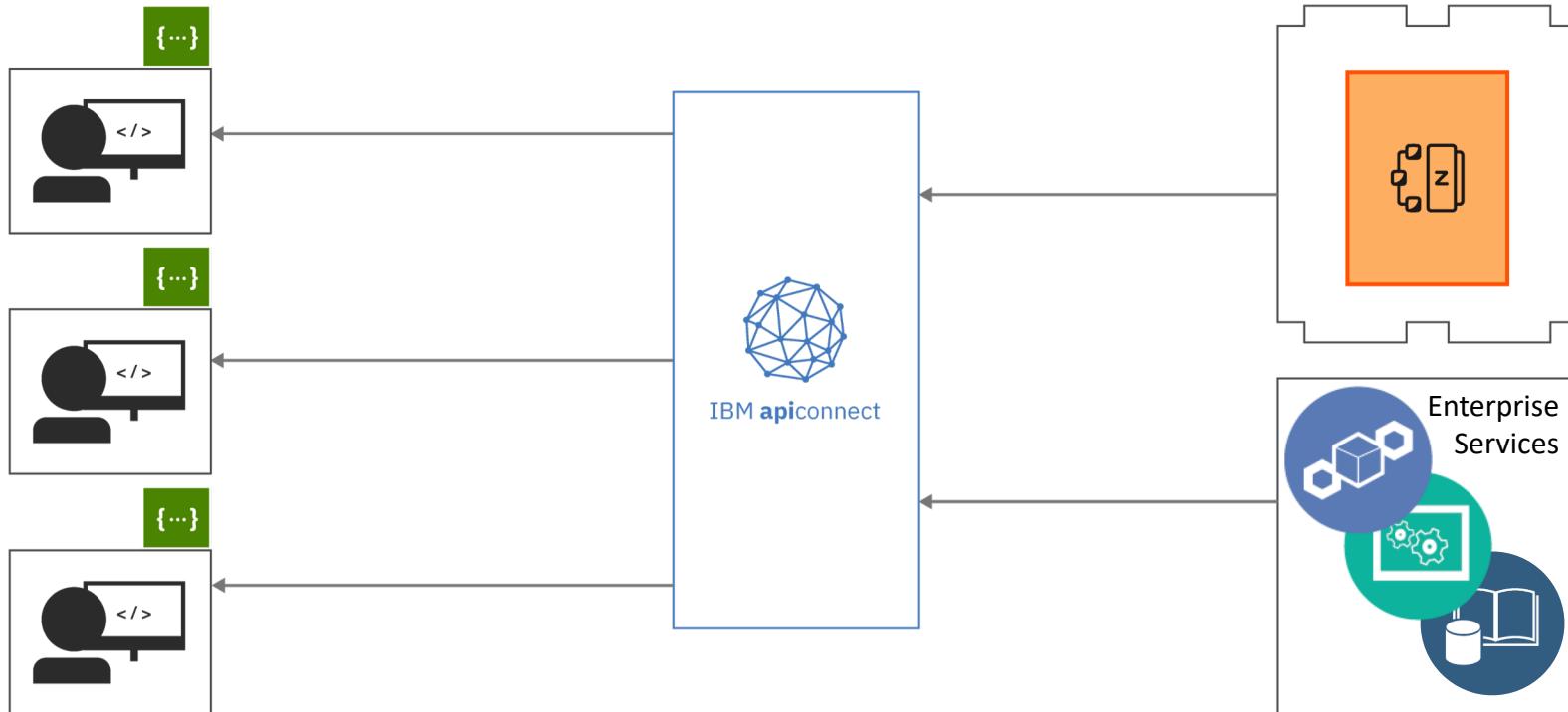
... Enforces threat protection provided by the API Gateway

API Entitlement



z/OS Connect EE

How do you control who has access to your APIs?

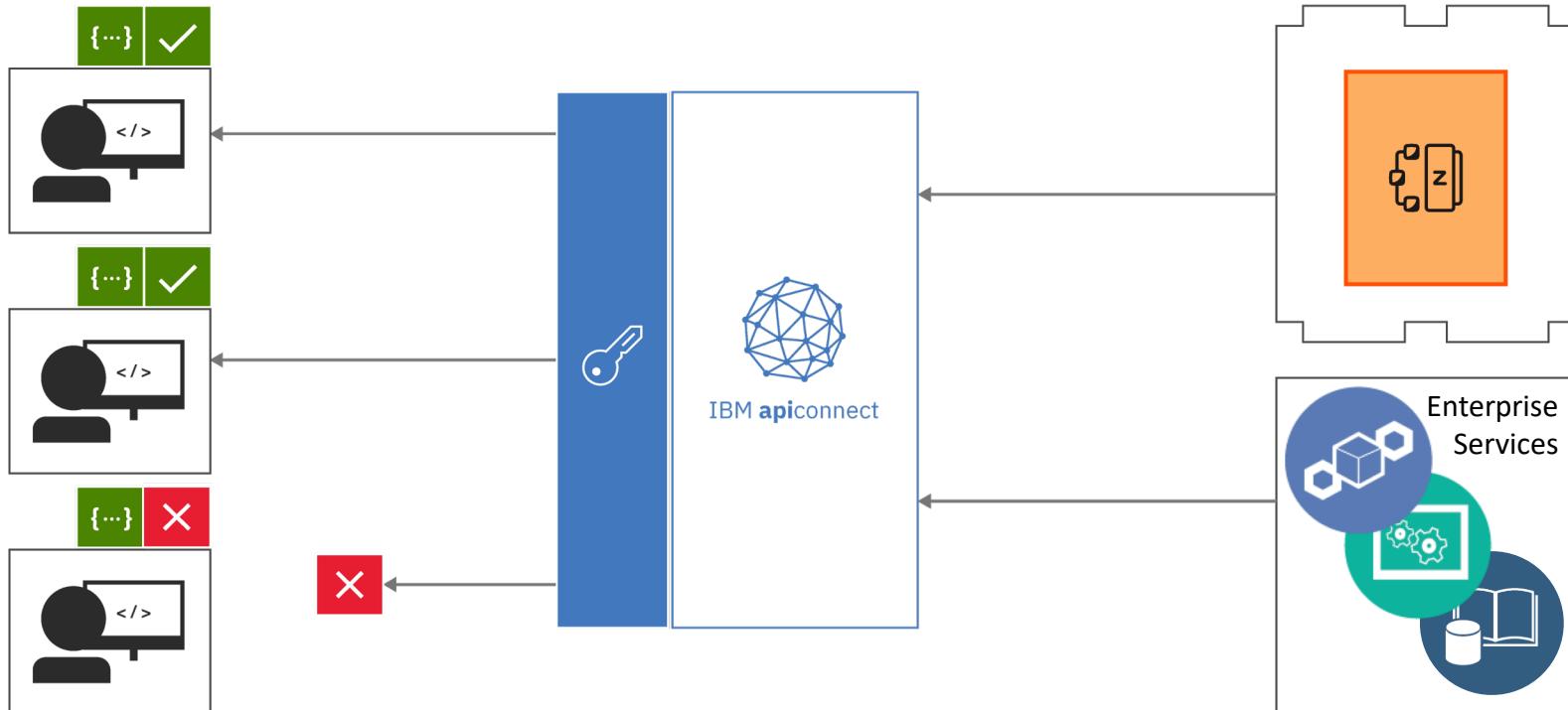


API Entitlement



z/OS Connect EE

API Keys!



API Entitlement



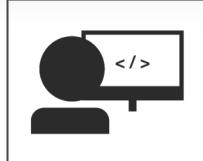
z/OS Connect EE

API Keys!



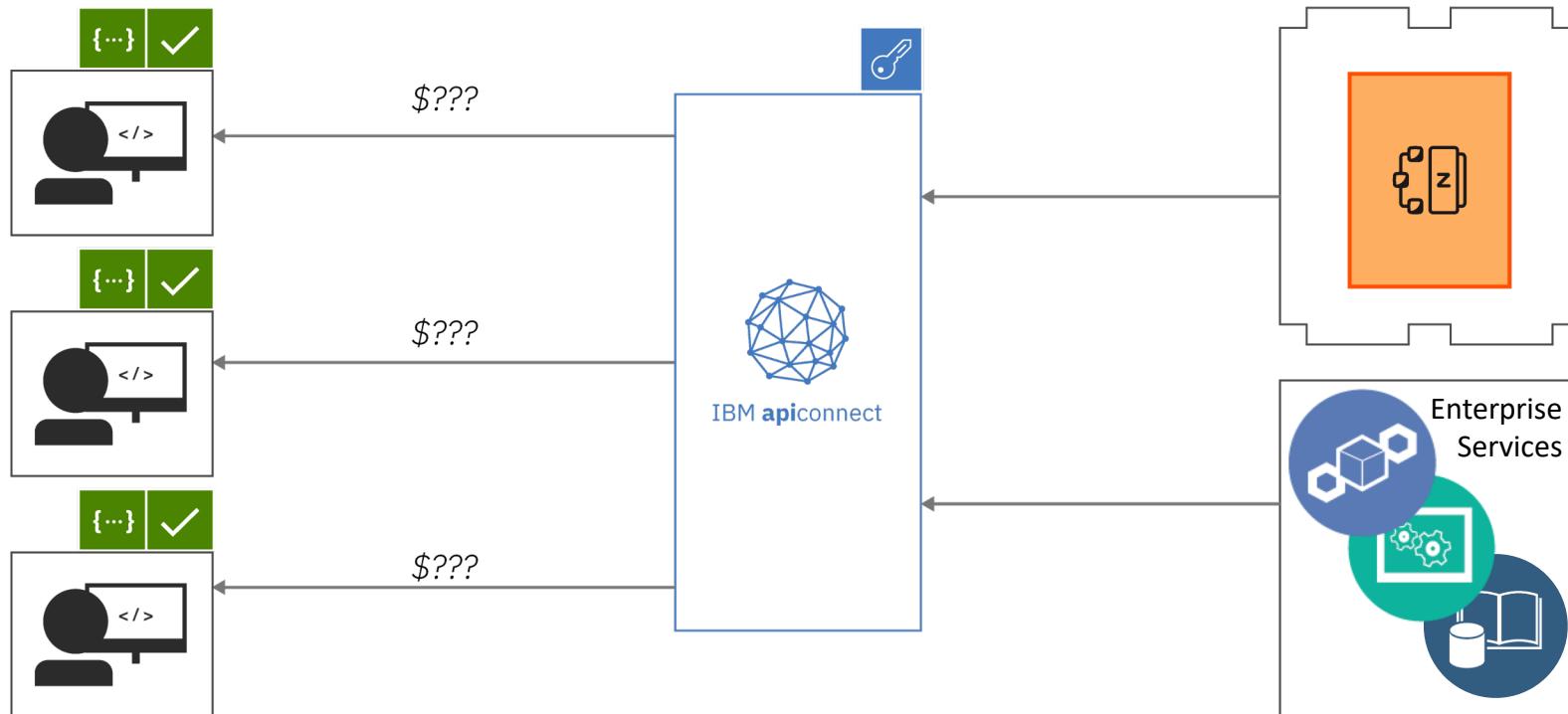
EXAMPLE REQUEST

```
curl --request GET \
--url 'https://sandbox.apihub.citi.com/gcb/api/v2/accounts/details?nextStartindex=REPLACE_THIS_VALUE'
--header 'accept: application/json' \
--header 'authorization: REPLACE_THIS_VALUE' \
--header 'client_id: REPLACE_THIS_VALUE' \
--header 'uuid: REPLACE_THIS_VALUE'
```



Billing

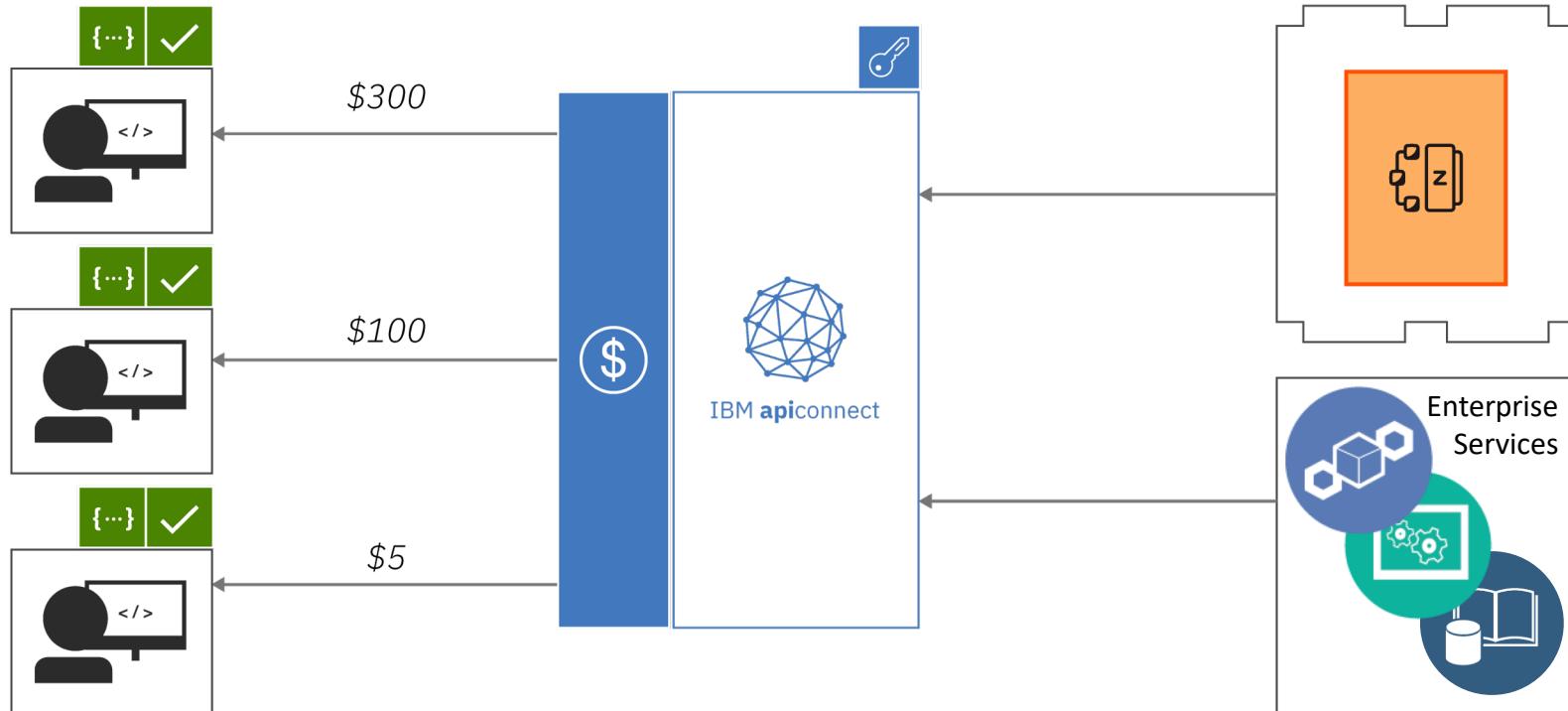
What about chargeback?





Billing

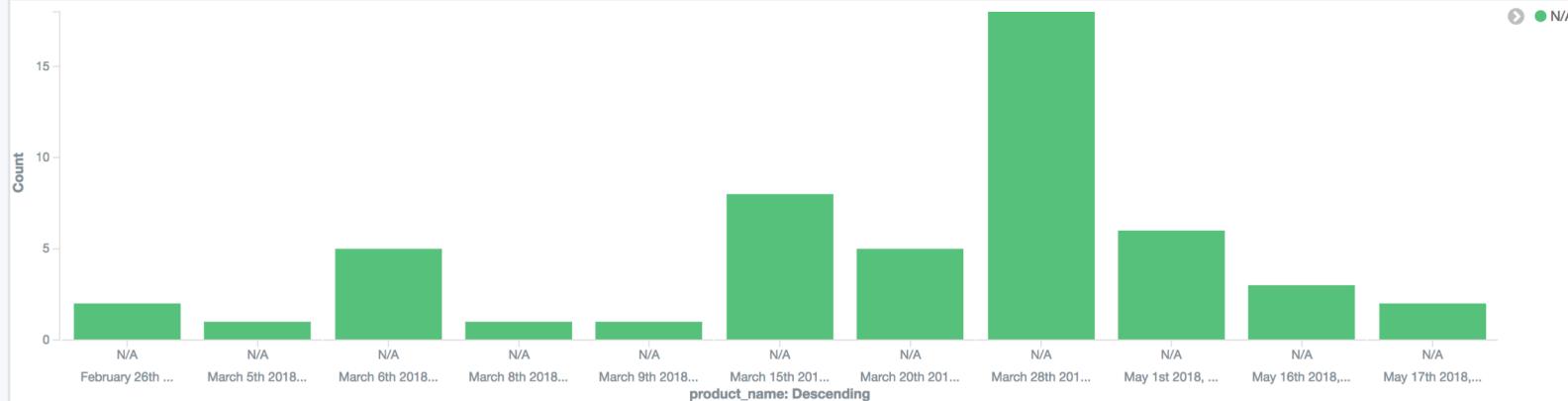
Your API management gateway should monitor usage so you can charge people pro-rata



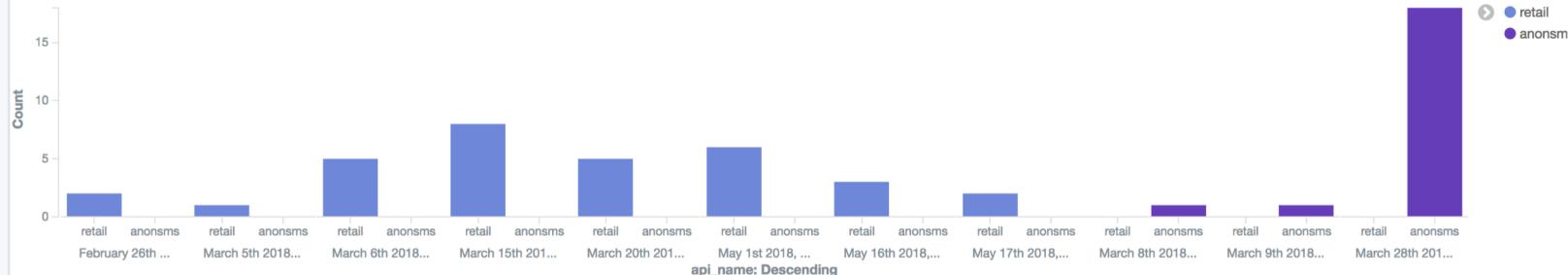
*File Print Add Share Export Download Last 90 days

zAPI Catalog - Overview

5 Most Active Products



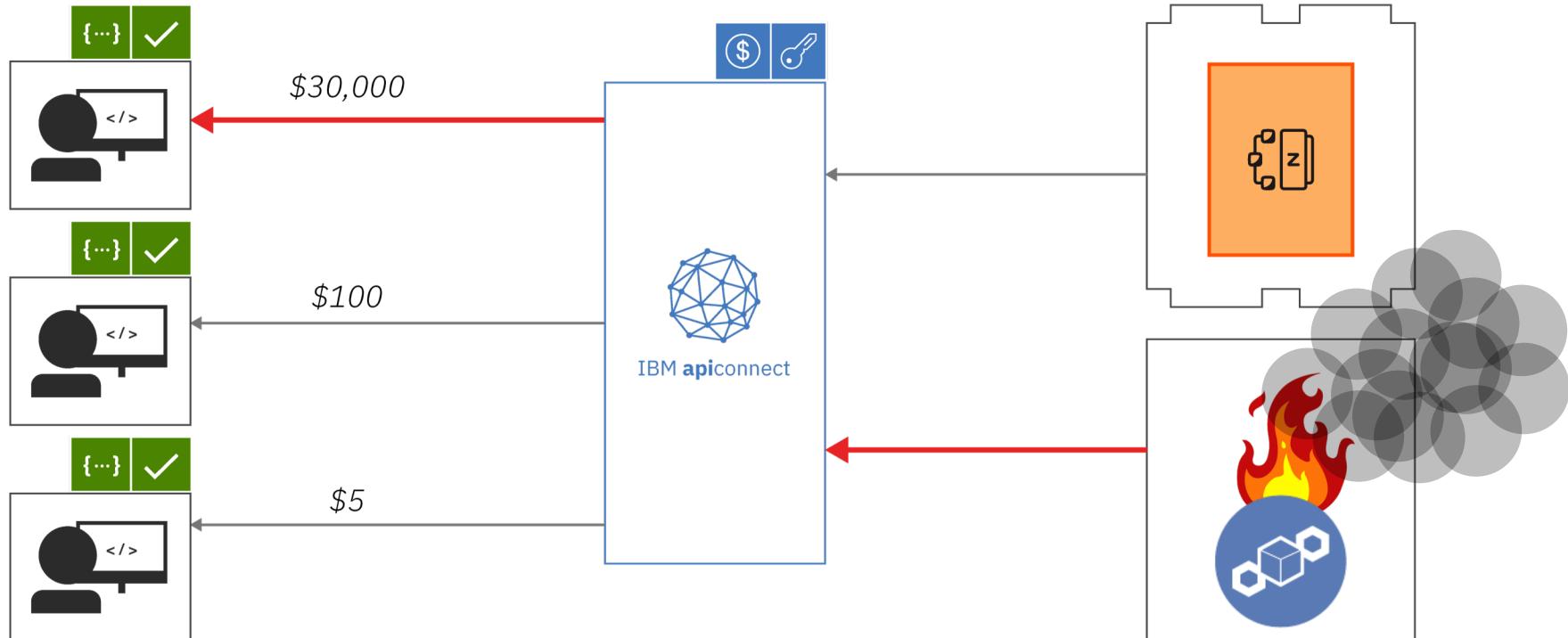
5 Most Active APIs





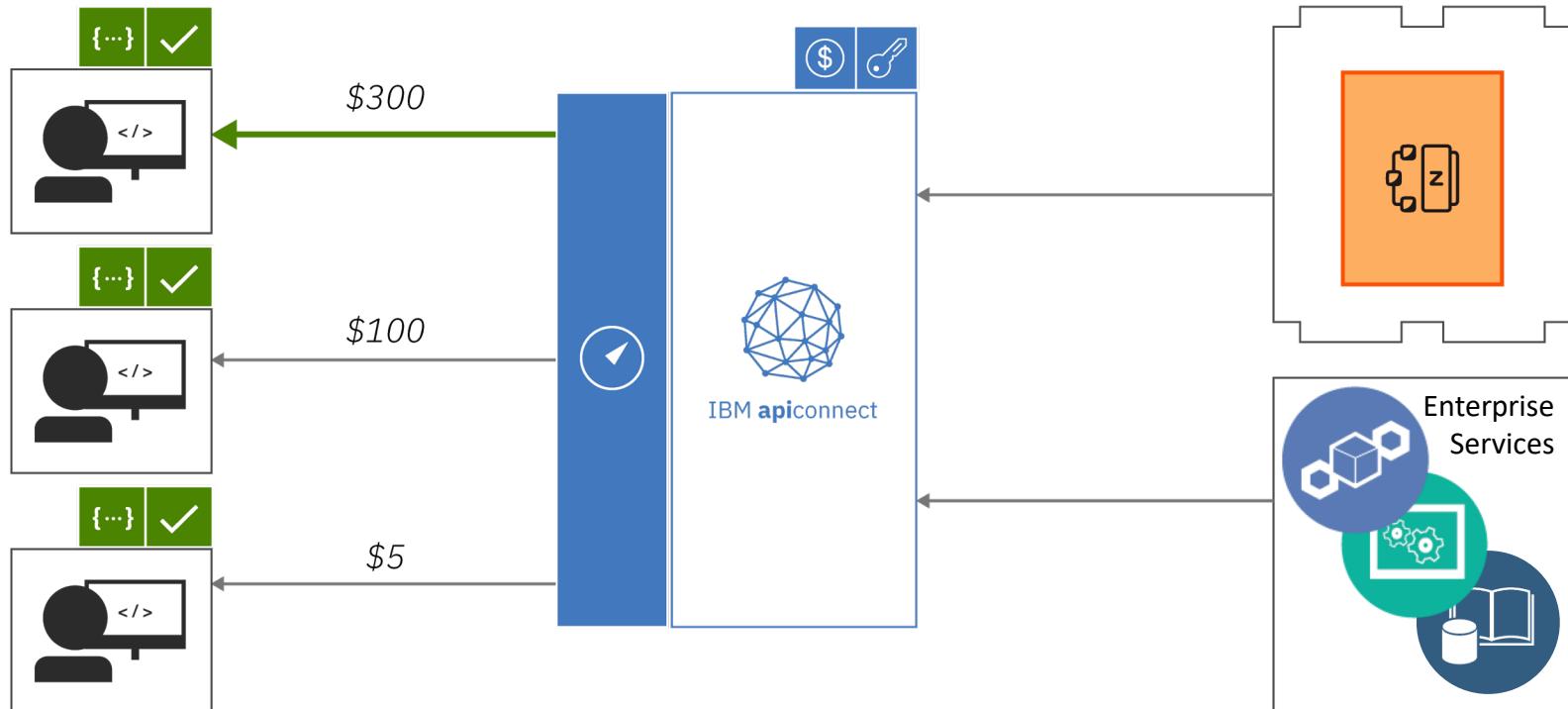
Traffic management

What about bad actors flooding your blockchain?



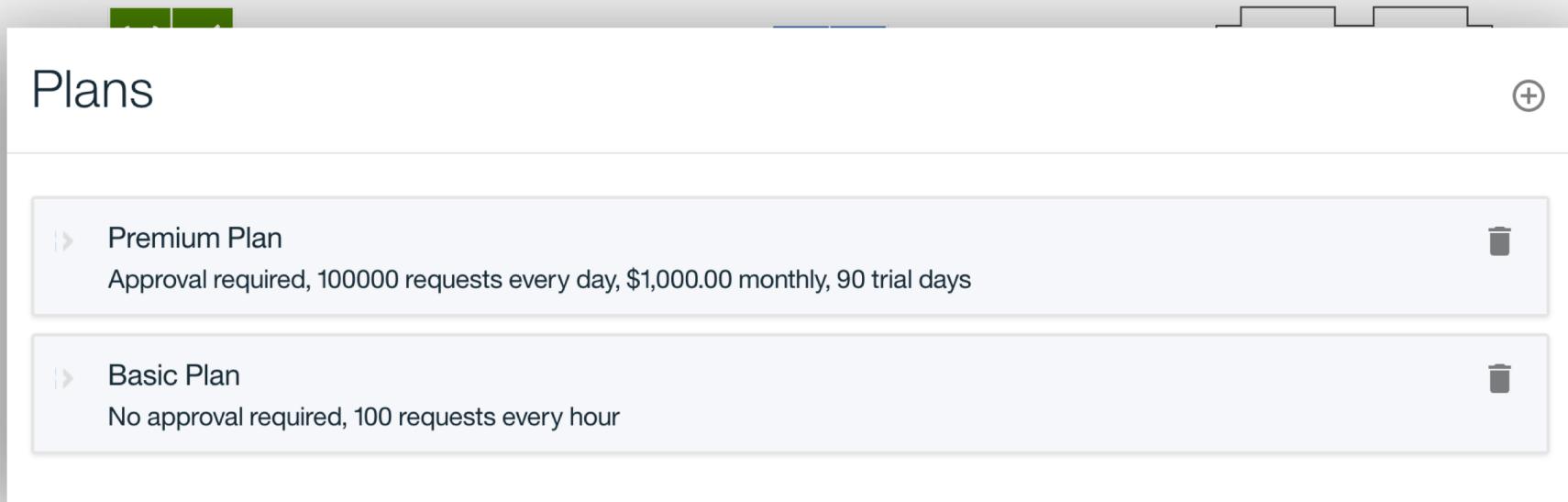
Traffic management

Your API management gateway needs to throttle requests if people exceed their quota



Traffic management

Your API management gateway needs to throttle requests if people exceed their quota



The screenshot shows a user interface for managing API plans. At the top, there are three green progress bars. Below them, the word "Plans" is displayed next to a plus sign icon. The main area contains two plan entries:

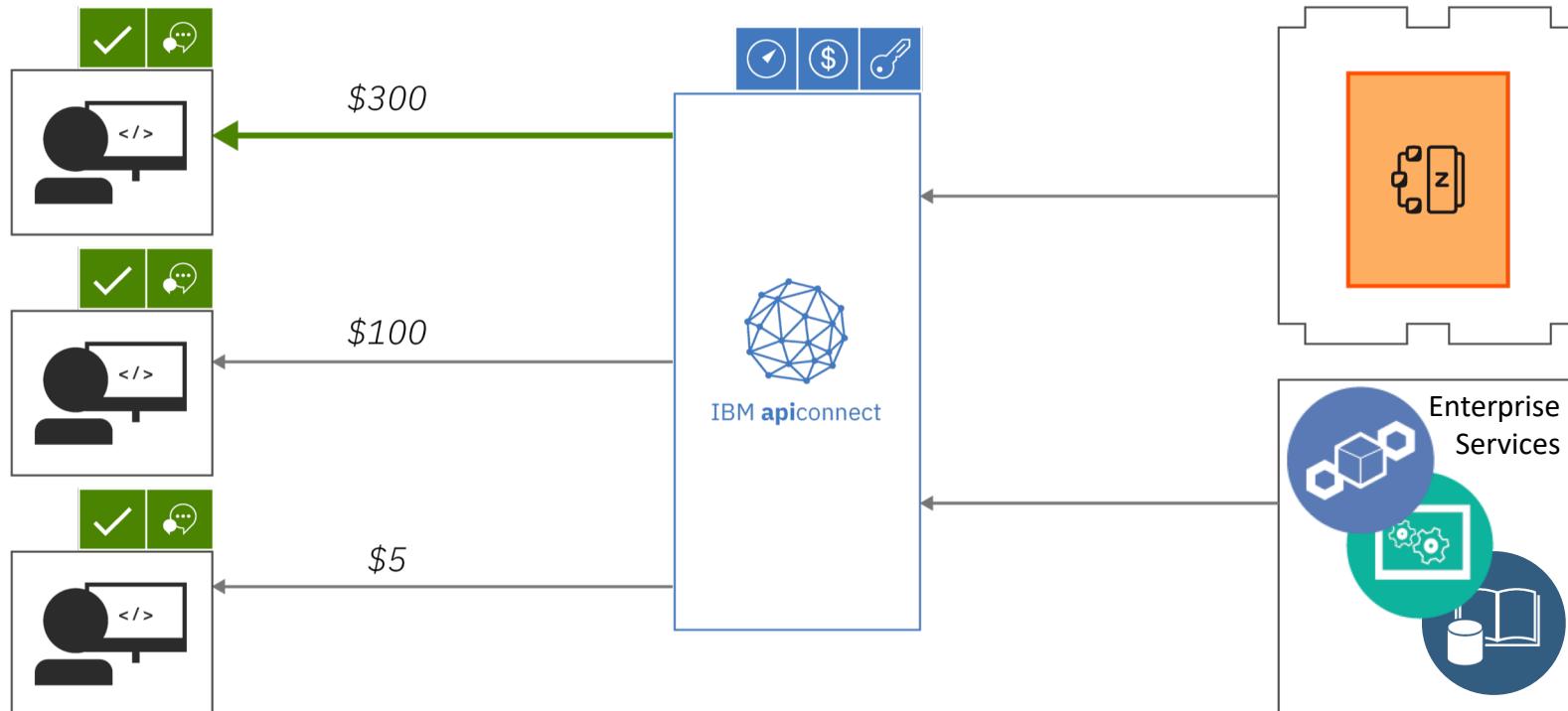
- Premium Plan**: Approval required, 100000 requests every day, \$1,000.00 monthly, 90 trial days. This entry includes a trash can icon.
- Basic Plan**: No approval required, 100 requests every hour. This entry also includes a trash can icon.





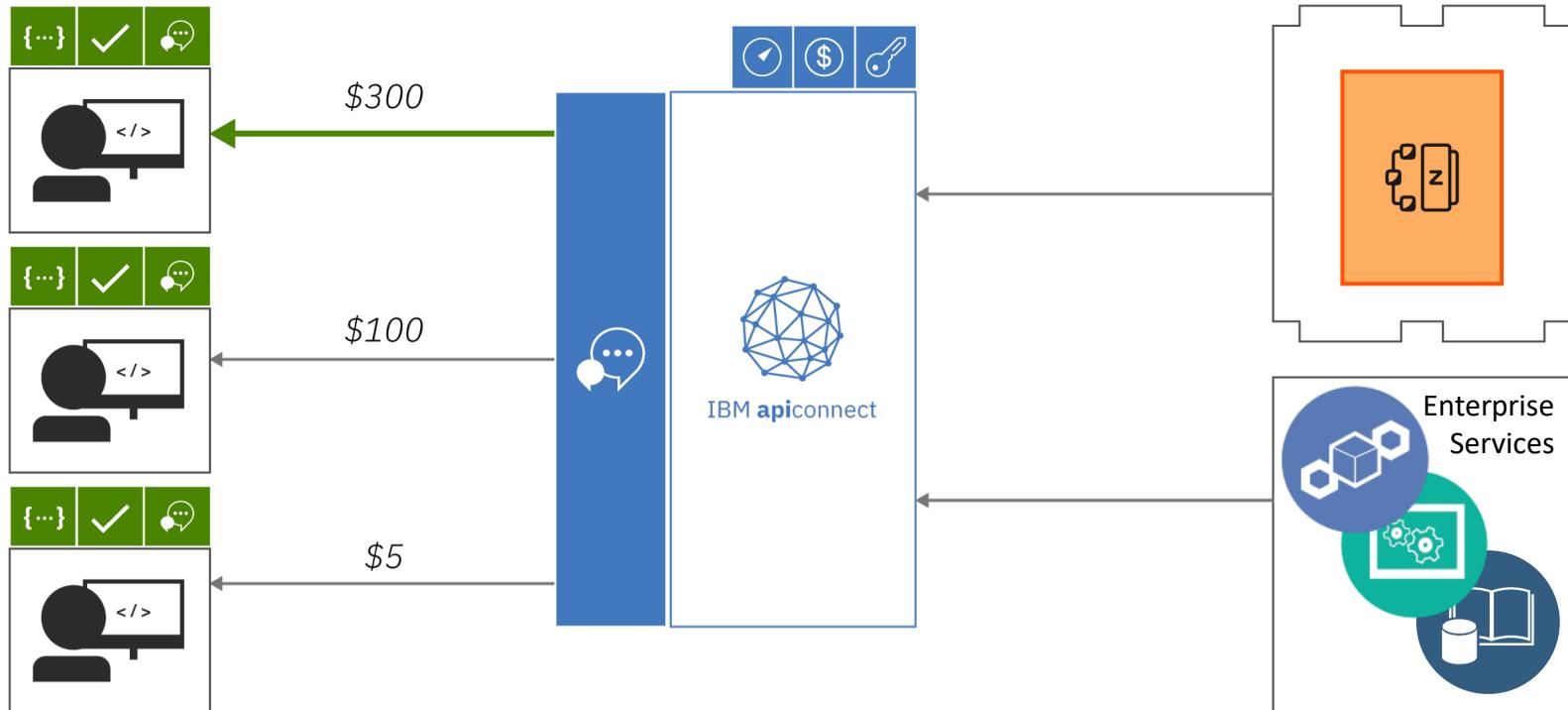
Developer Community

“How do I find out about new versions and upcoming changes?”



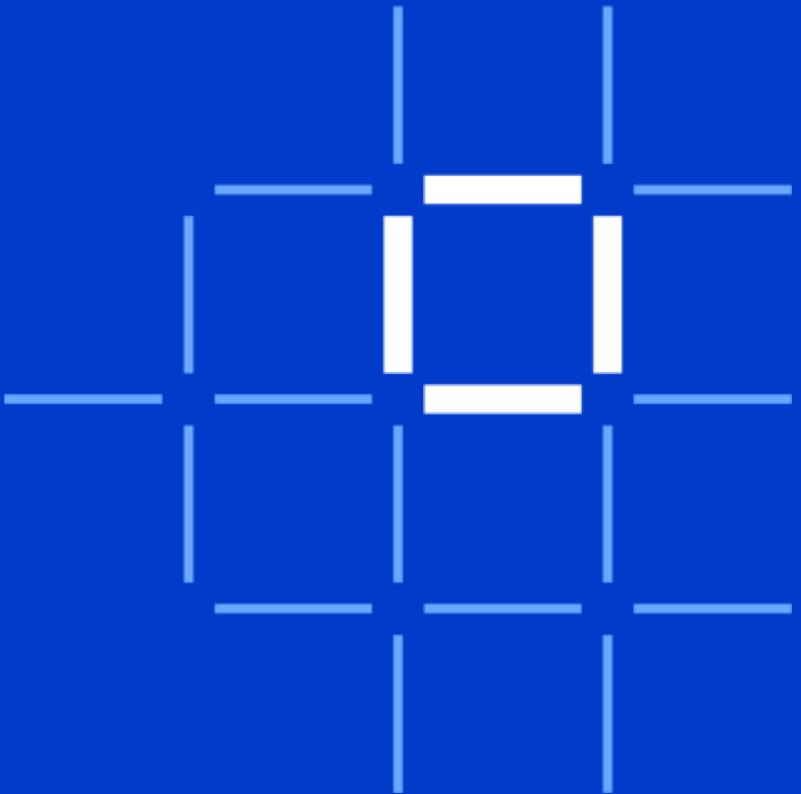
Developer Community

Your API management gateway should allow you to engage with your dev community



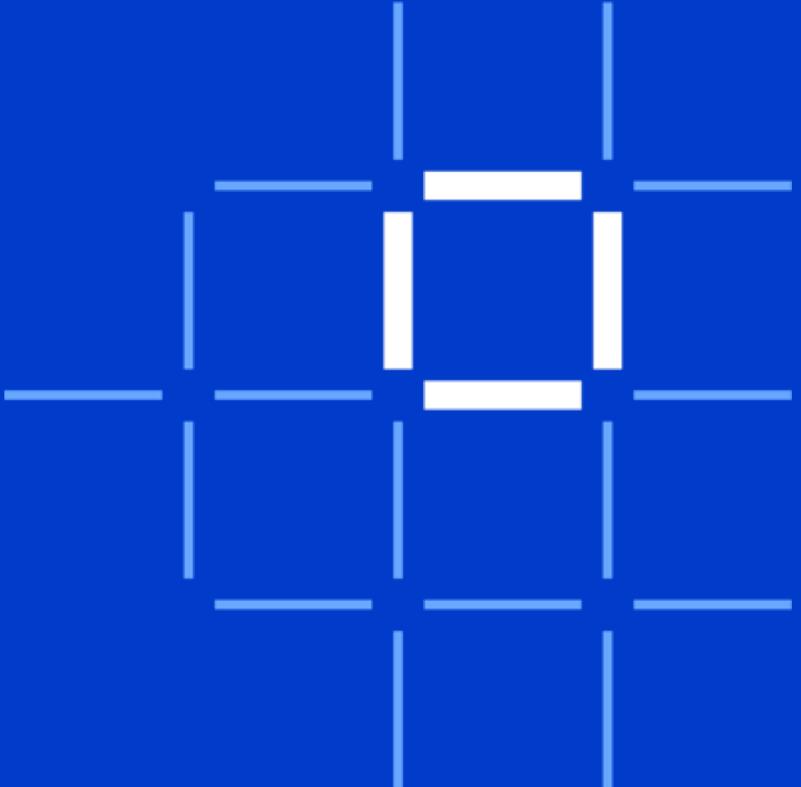
Demo Time

Now let's see it
in practice.



Conclusion

- DLT is reshaping how we do business.
- We must unlock the value of the existing assets
- A well defined backend API strategy is the first step.





BLOCKCHAIN

IBM Cloud Blockchain Starter Plan

Begin building your network with Starter Plan, which offers an easy-to-use UI that reduces your network administration and governance time, an iterative development platform, and basic service levels for pilot evaluation or pre-production POCs.



For more information visit [IBM Cloud Blockchain](#)



IBM z Systems Trial Program

Try the latest z/OS Connect EE capabilities today at zero cost, and with no installation required.



Find out more, and sign up now at ibm.biz/ibmztrial

Thank you

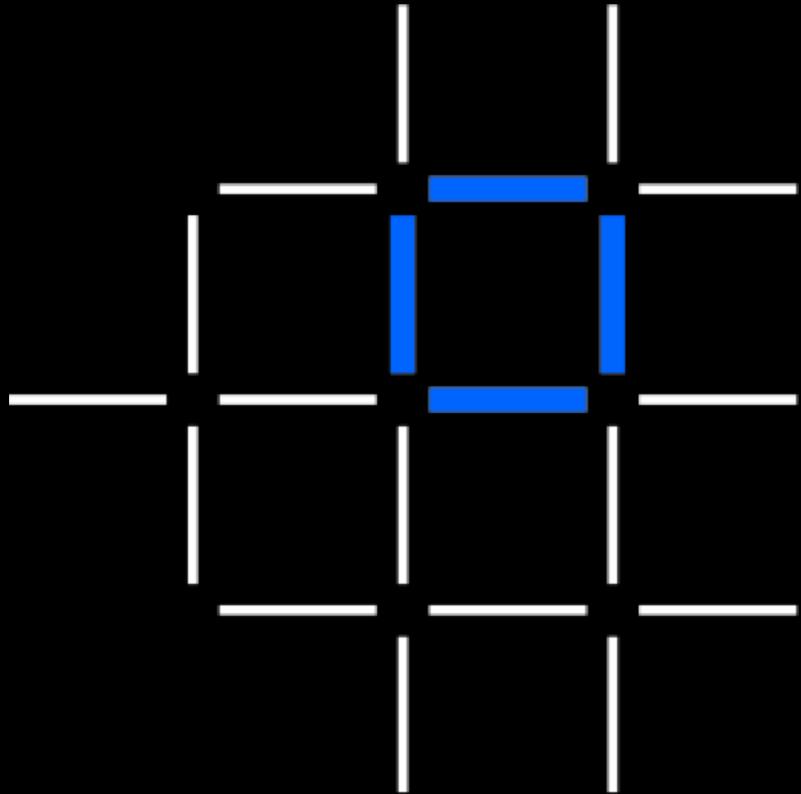
*Steven Bodie
Senior IT Specialist
IBM Hybrid Cloud Integration*

*Questions? Tweet us or
go to ibm.com/blockchain*

 @IBMBlockchain

 IBM Blockchain

 IBM Blockchain





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