API Connect Architecture (Micro Services)

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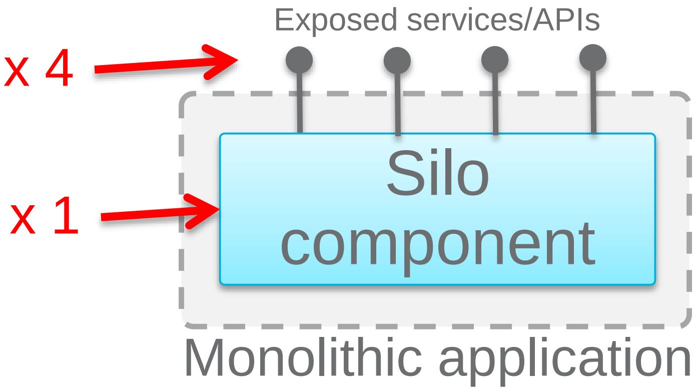
Microservices

Common misconception resulting from the term “microservice”

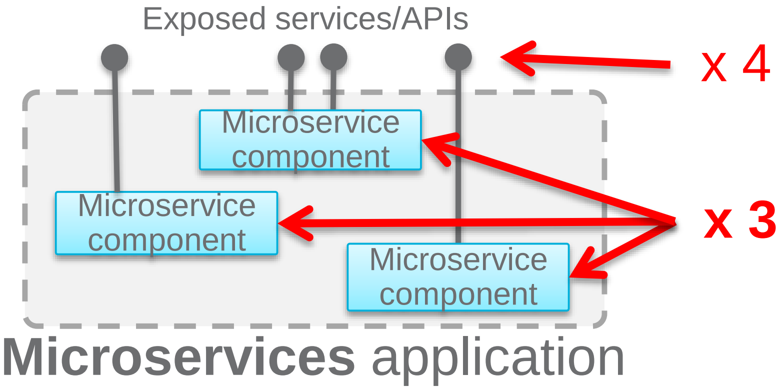
~~Microservices are just more fine grained web services~~

~~APIs are microservices~~

“micro” refers to the granularity of the ***components****,*
not the granularity of the exposed interfaces



Monolithic application



Microservices application

Is “microservices architecture” is really “micro-component architecture”?

Clarification on Microservices vs APIs - short video (4 mins)
http://ibm.biz/MicroservicesVsAPIVideo

Inter-microservice vs. inter-application communication

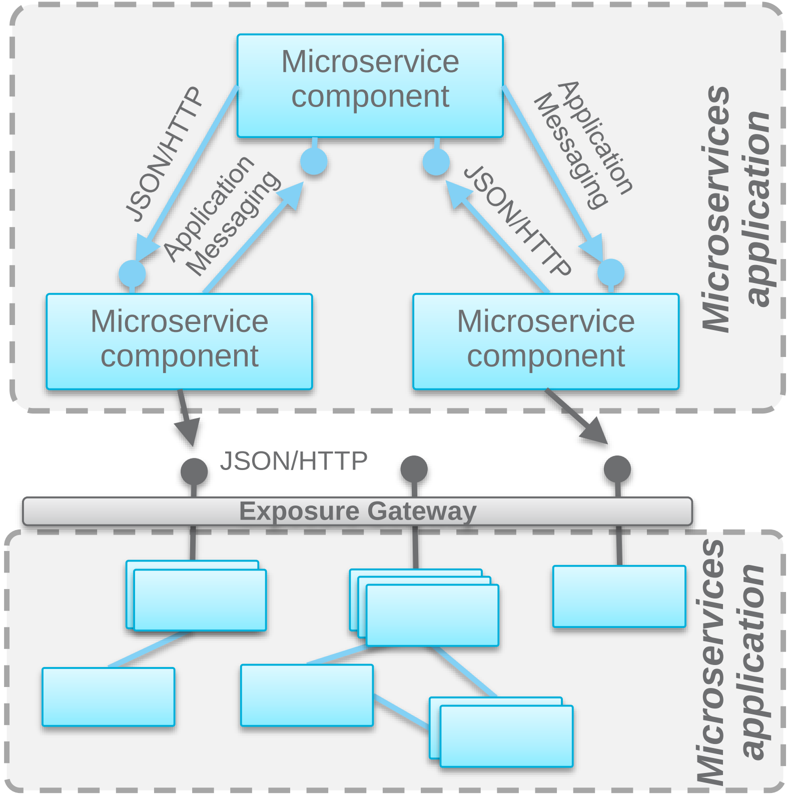
Inter-**microservice** communication

- Lightweight protocols: HTTP, application messaging
- Runtime component registry
- Client-side load balancing and circuit breaker patterns

Inter-**application** communication

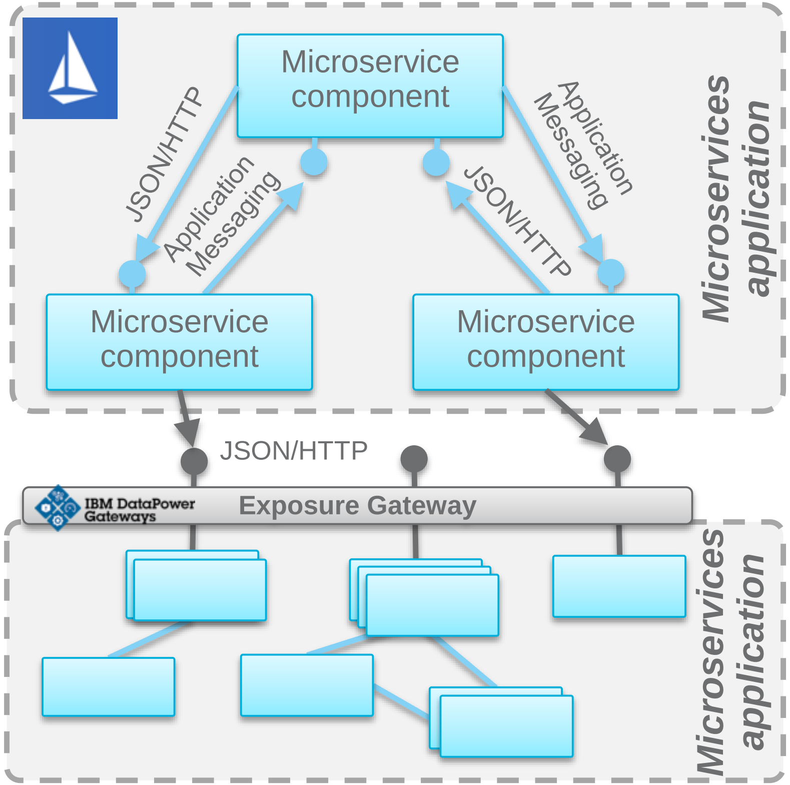
- Enterprise protocols: Managed API gateways, enterprise messaging
- Design time developer portals
- Gateway load balancing and throttling

JSON/HTTP RESTful communication styles may be present in both types of communication, but their implementation may be radically different.

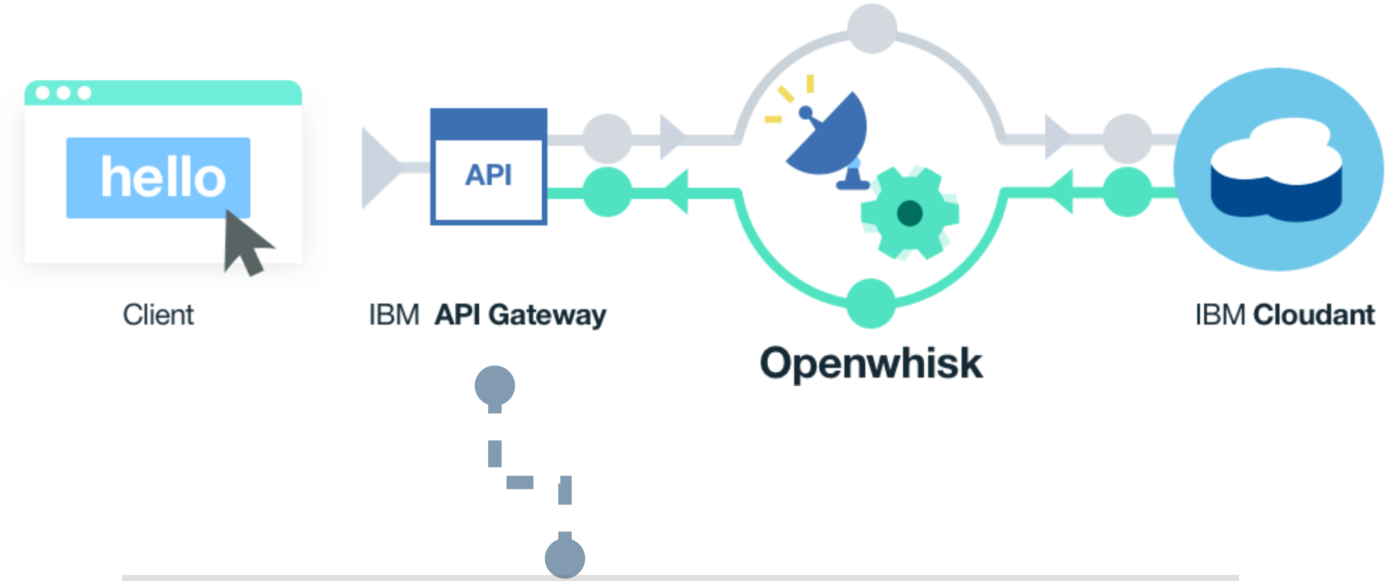


ISTIO – microservices management

- Inter-service proxy between microservices (ie polygot runtimes)
  - Non-intrusive to App (ie transparently intercepted and proxied)
- Inject app-smarts (ie rate limit, security, etc …) in the network without making app changes
- Pluggable decision maker called **mixer** optimized for inter-service communication for enforcing



Microservices Example: Securing and Controlling your Serverless Action…



API Gateway takes care of:
Throttling (Rate limiting)
Security (API Key, Secret, OAUTH, CORS)
Map Endpoints to Actions & Define them
Branding

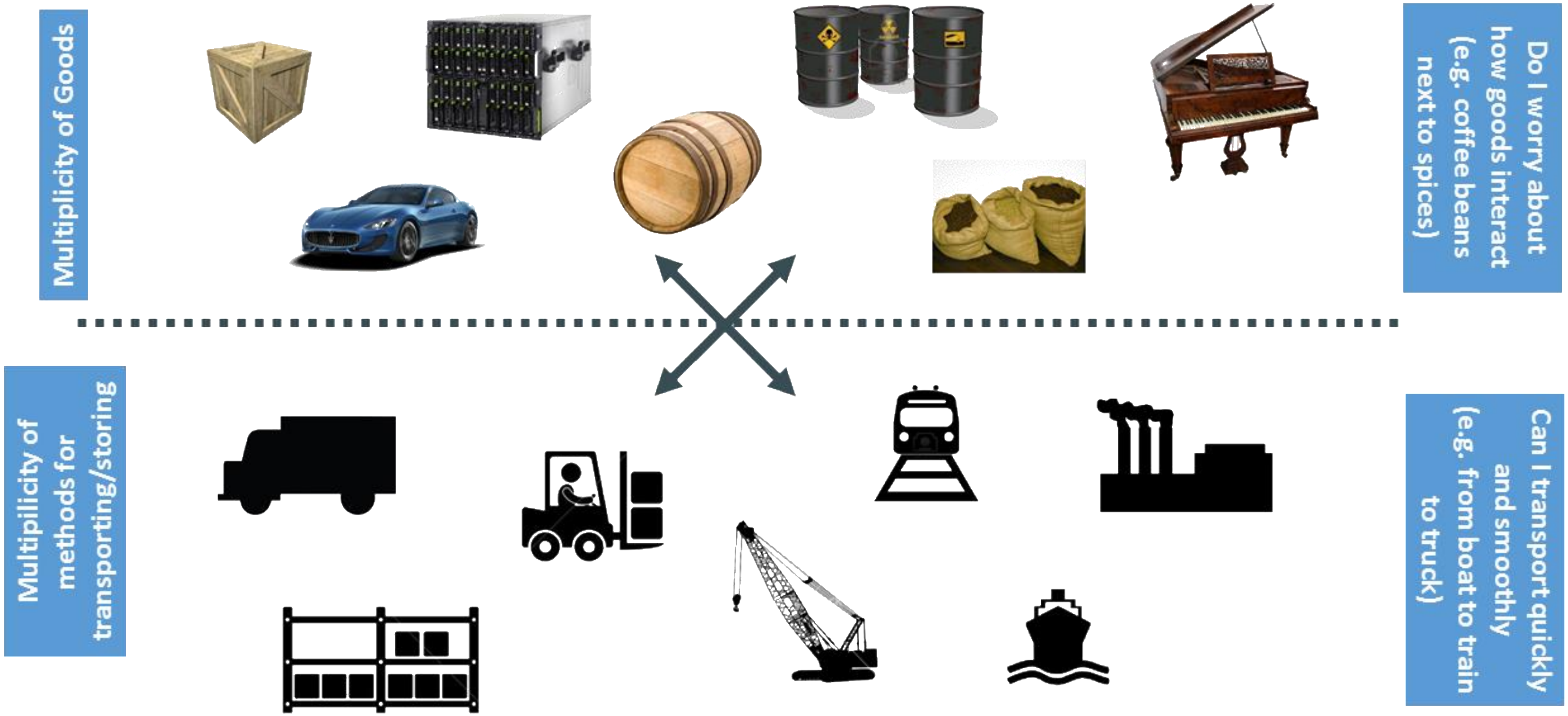
Define API Endpoints (URLs)
(optionally by using custom domains)

Define Actions:
getCostumer
createCostumer
deleteCostumer

Map Endpoints to Actions
Get
Post
Delete

Docker

What are containers?



Multiplicity of Goods

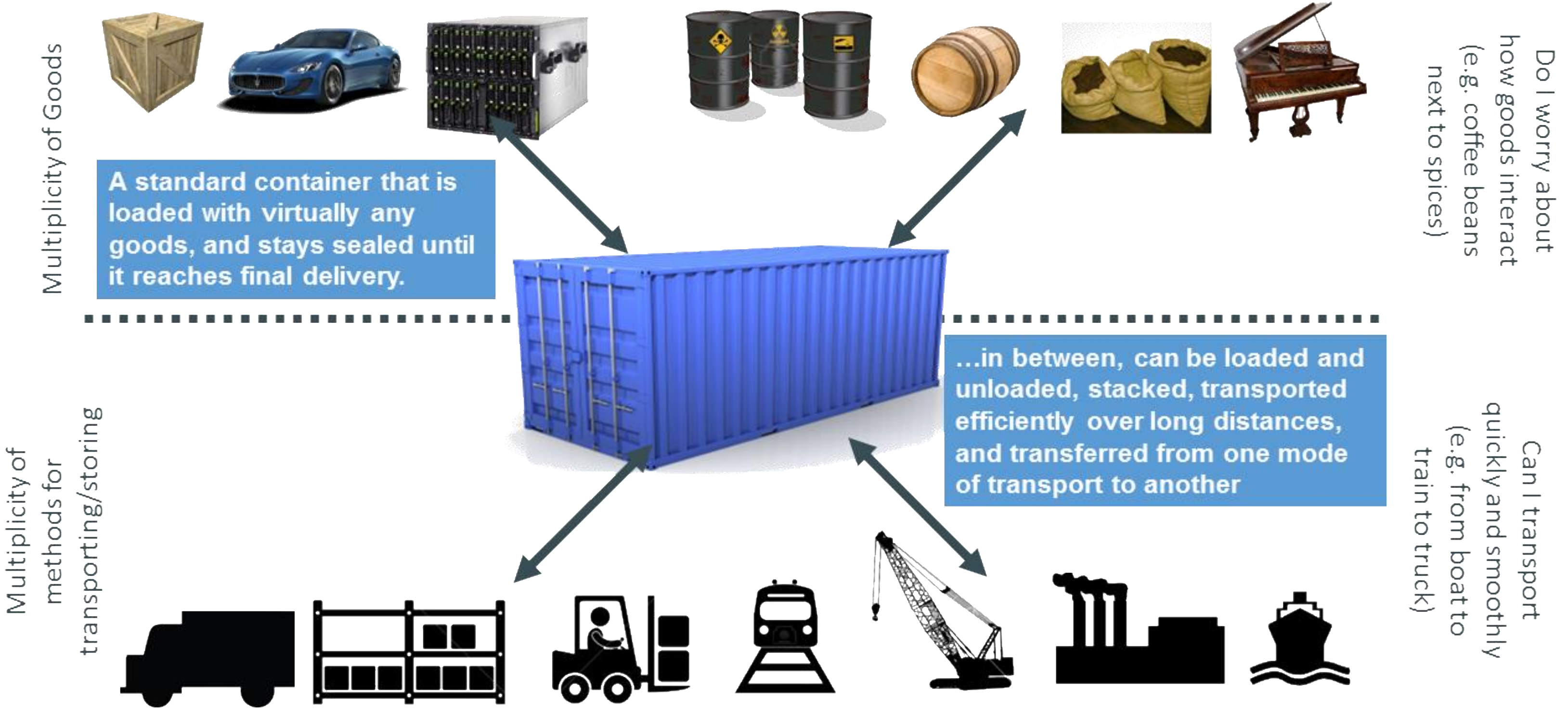
Do I worry about how goods interact (e.g. coffee beans next to spices)

Multipilicity of methods for transporting/storing

Can I transport quickly and smoothly (e.g. from boat to train to truck)

Source: http://slidedeck.io/pointful/docker-intro

What are containers?



Multiplicity of Goods

A standard container that is loaded with virtually any goods, and stays sealed until it reaches final delivery.

Do I worry about how goods interact (e.g. coffee beans next to spices)

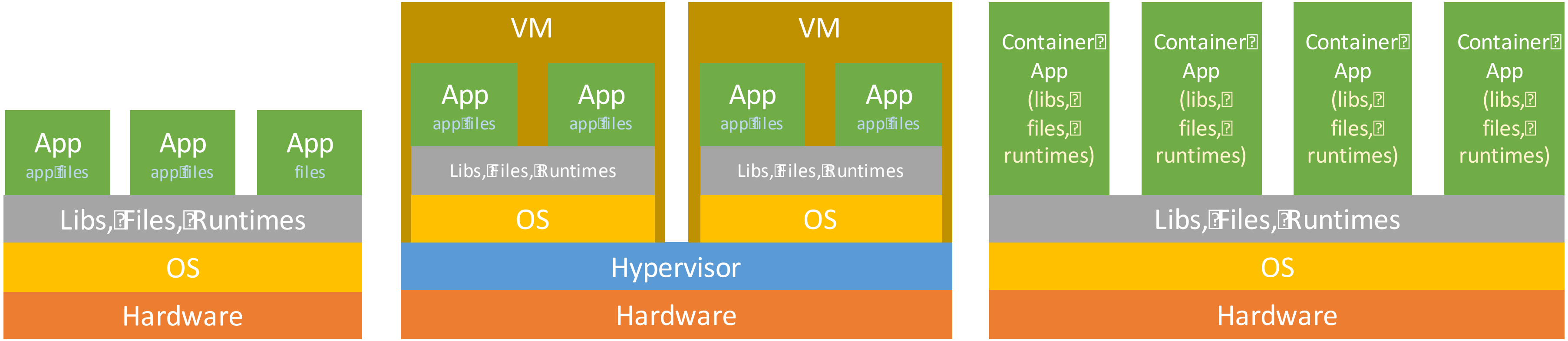
…in between, can be loaded and unloaded, stacked, transported efficiently over long distances, and transferred from one mode of transport to another

Multiplicity of methods for transporting/storing

Can I transport quickly and smoothly (e.g. from boat to train to truck)

Source: http://slidedeck.io/pointful/docker-intro

Background and History



Early days in the Data Center: A dedicated OS for the hardware and several apps deployed in that OS sharing the libraries and runtimes

Virtualization in the Data Centers: A hypervisor enables sharing of the hardware resources across multiple virtual machines with their own definition of CPU, memory, storage and dedicated OS

Modern Data Centers: Each container defines its own sandbox where it loads its required versions of libraries, distinct file system isolation (through layers) and application components and runtimes.

How is IBM involved?

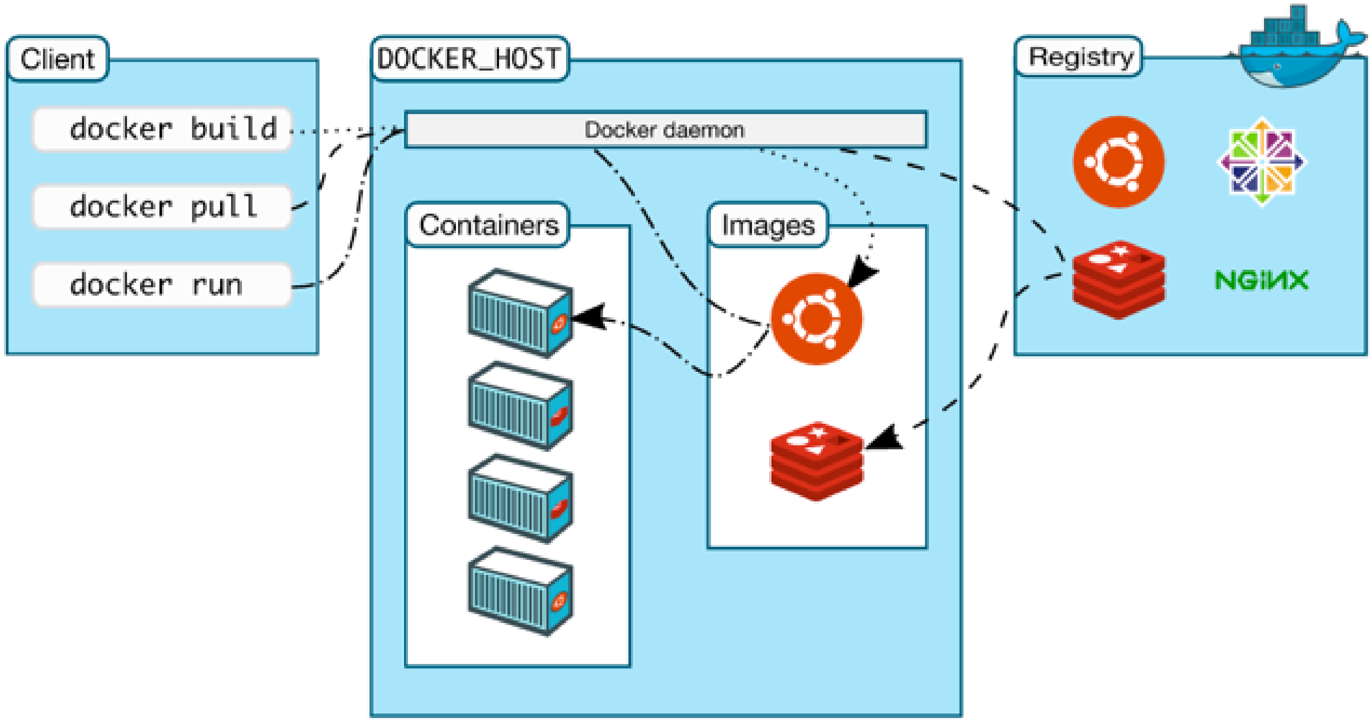
IBM CONTAINERS

- Fully managed **hosted runtime**
- **Integrated** logging, monitoring, load balancing, registry and auto-scaling
- Advanced **security** features
- Built using **Docker** technology

OPEN CONTAINER INITIATIVE

docker

What is Docker?



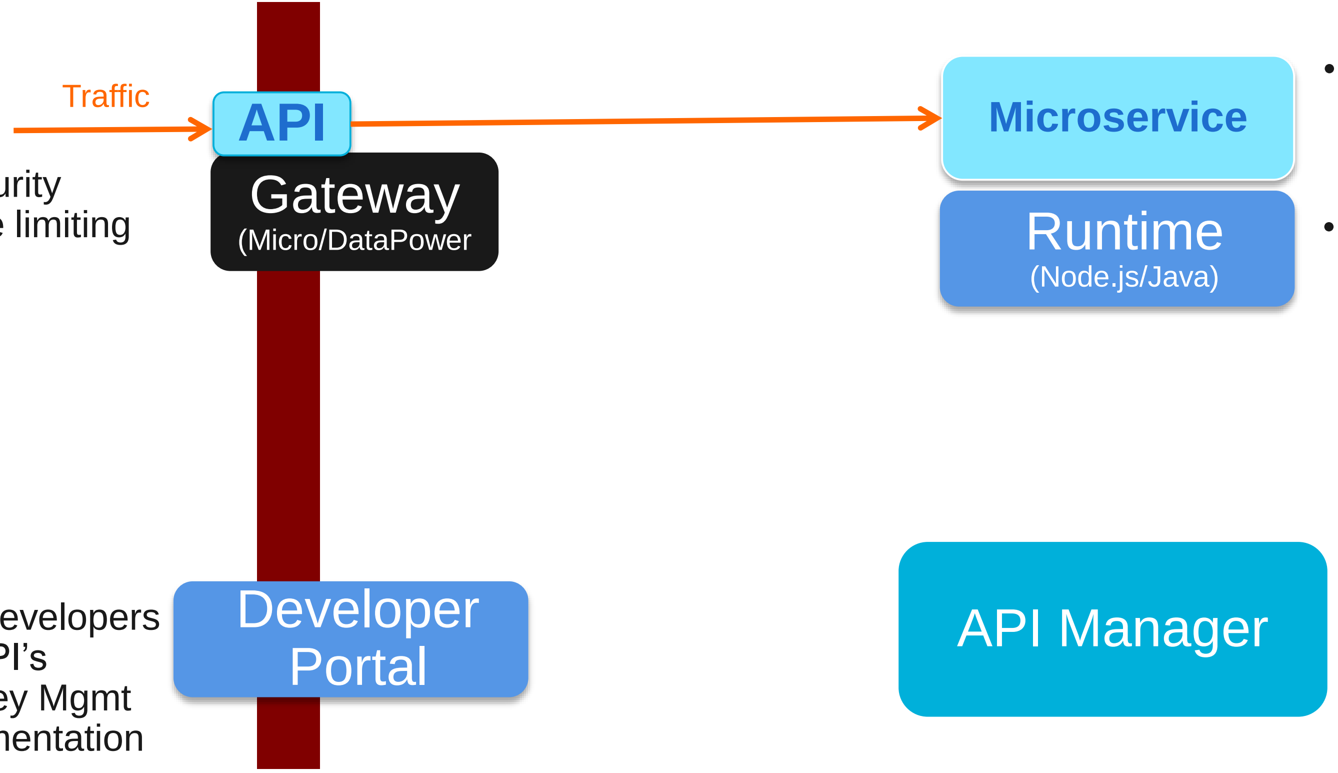
Source: https://docs.docker.com/engine/understanding-docker/#/what-is-dockers-architecture

Why Containers?

- Portable runtime environment for your applications
- No need to worry about missing dependencies, packages, and other concerns during deployments
- Each app is run in it’s own isolated container, and as a result you can run different versions of libraries for each app
- You can automate testing, integration, packaging of your application
- Consistent and repeatable process for app lifecycle
- No more inconsistencies between dev, test, production
- Speeds up continuous deployment and continuous integration

API Connect

API Connect Concepts



Traffic

API

Gateway
(Micro/DataPower

- Security
- Rate limiting

Microservice

- The “brains” of the API. Does all the work.

Runtime
(Node.js/Java)

- Handles HA for the microservice

Developer Portal

- How developers find API’s
- API Key Mgmt
- Documentation

API Manager

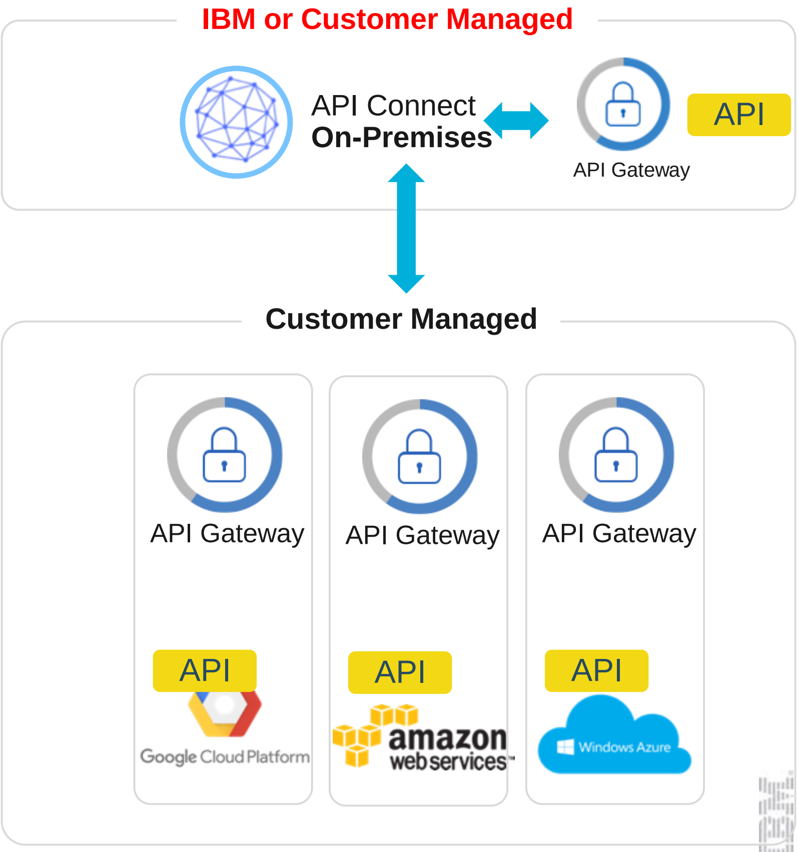
- How API owners manage API’s
- Access control
- Permissions
- Monitoring
- Analytics

Hybrid Deployment – APIC with Co-located Gateways

- Deploy API management, analytics and socialization developer portal **on-premises** for enhanced corporate control

- **Co-locate** DataPower API Gateway with backends on-premises and/or public clouds for greater flexibility and performance

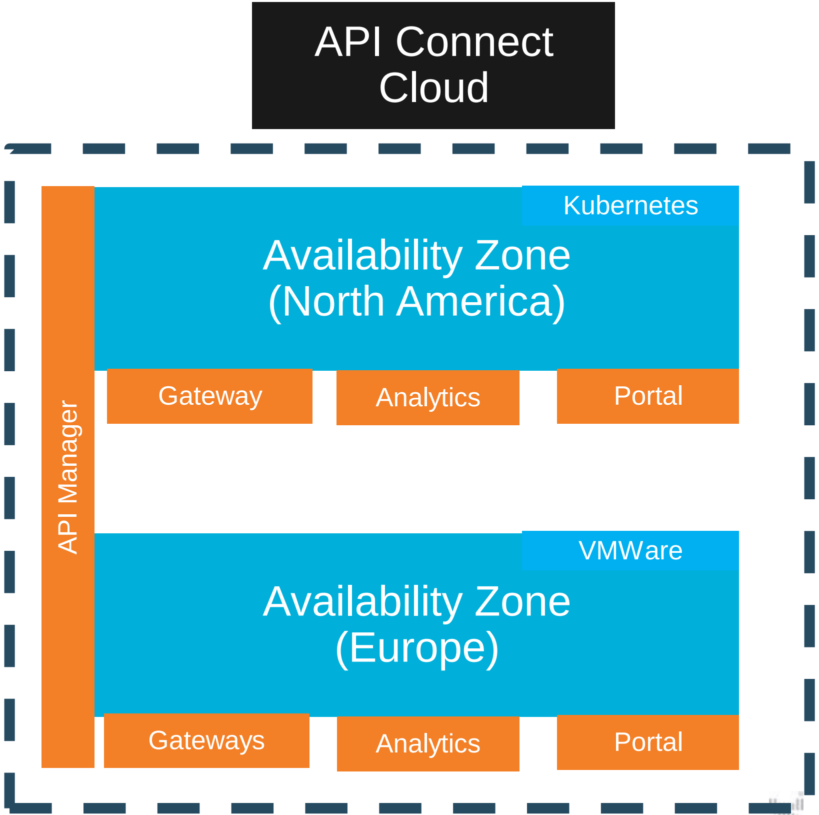
- Speed deployment of co-located API Gateway and reduce risks with **DataPower support for Docker**



Roadmap

API Connect Cloud (1 of 2)

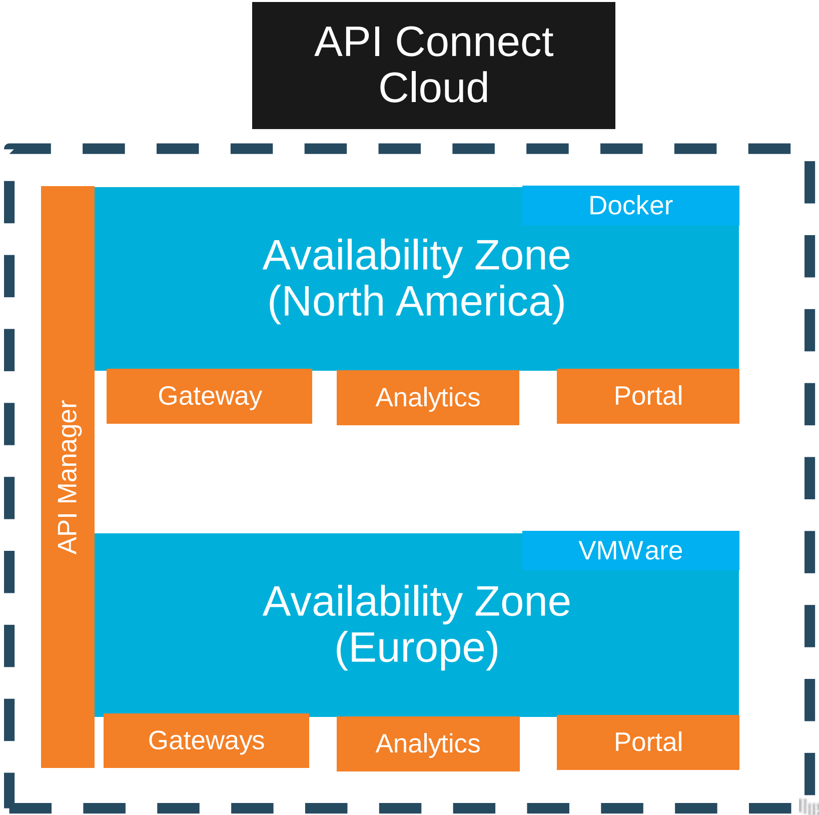
- Single API Connect Cloud consists of **four core services**:
  - API Manager
  - Gateways
  - Analytics
  - Portal
- API Manager is a **single cluster** across multiple availability zones (AZ)
- Multiple Gateway/Analytics/Portal clusters are available within an AZ
- Gateways can bind to a specific Analytics service when co-located



Roadmap

API Connect Cloud (2 of 2)

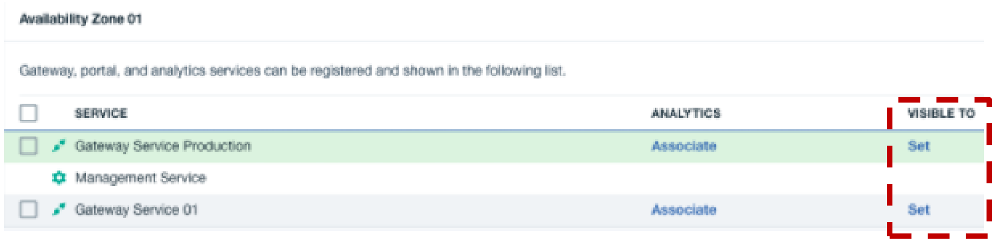
- Each **Availability Zone defines a deployment target** (Docker or VMWare)
- Docker:
  - Initial delivery focuses on deploying services using **Kubernetes**.
  - AZ **discovers** Services (gateway/analytics/portal) from the Kubernetes platform
- VMWare
  - Packaged as OVA file
  - Admin **manually** Register services (gateway/analytics/portal)



Roadmap

API Connect Cloud services constrained to provider organizations

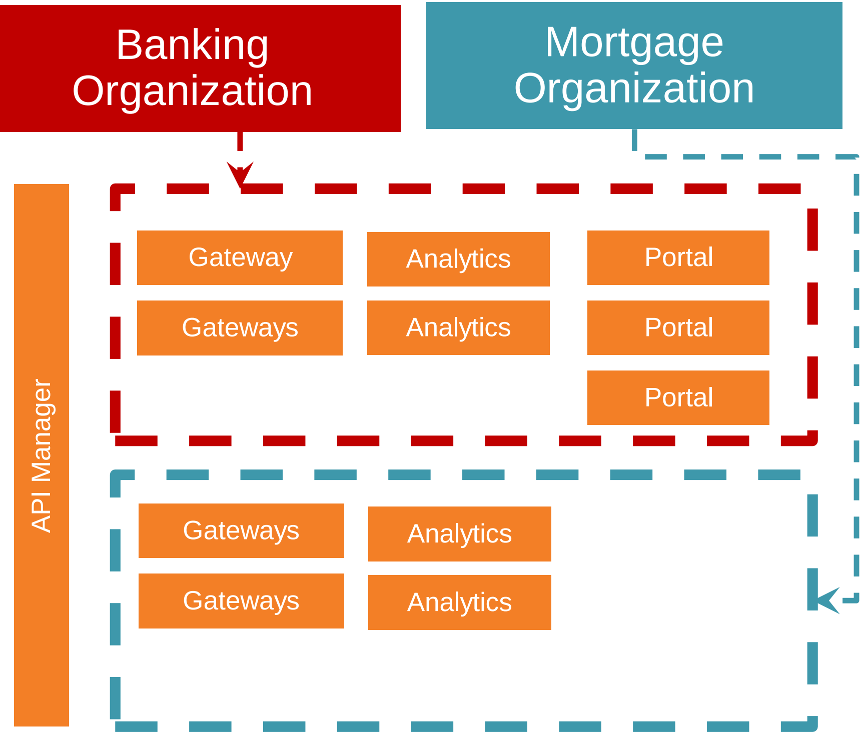
- Cloud administrators can restrict access to services (Gateway/ Analytics / Portal) to specific provider organizations



Availability Zone 01

Gateway, portal, and analytics services can be registered and shown in the following list.

□	SERVICE	ANALYTICS	VISIBLE TO
□	Gateway Service Production	Associate	Set
	Management Service		
□	Gateway Service 01	Associate	Set



Banking Organization
Mortgage Organization
API Manager
Gateway
Analytics
Portal
Gateways
Analytics
Portal
Portal
Gateways
Analytics
Gateways
Analytics