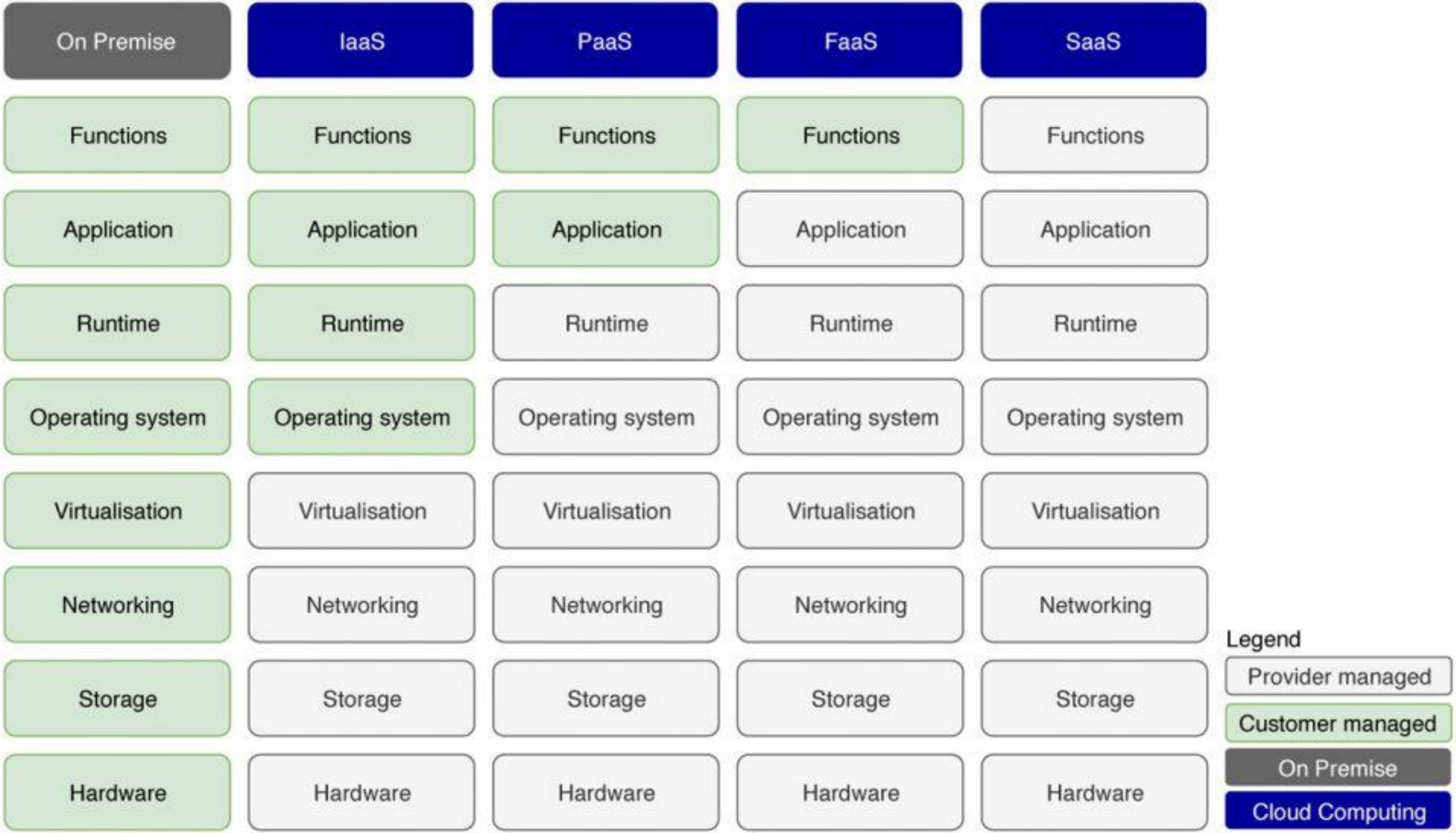
Serverless in a hybrid architecture

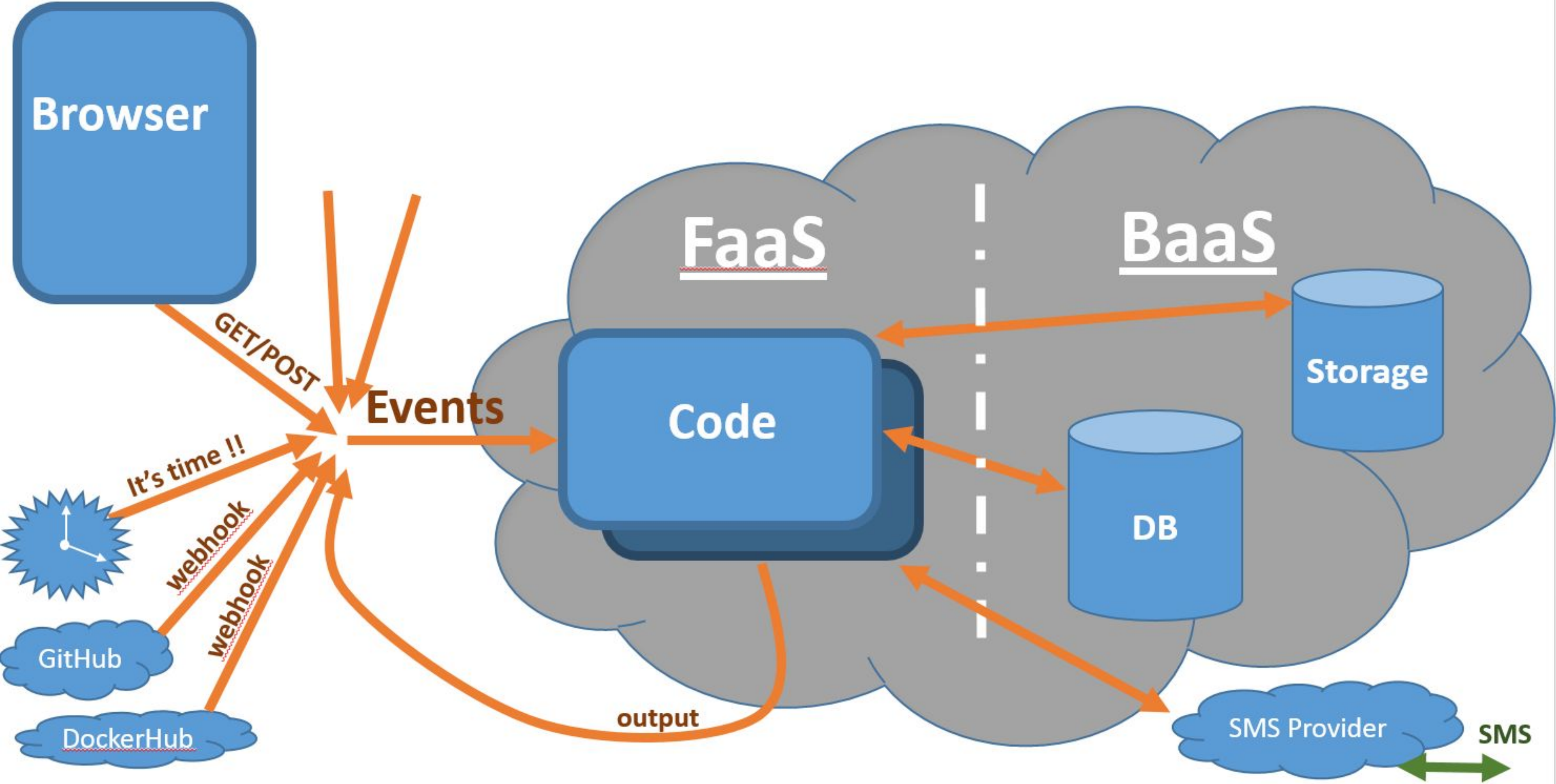
Abdelmoujib Megzari
Bassam Gamal

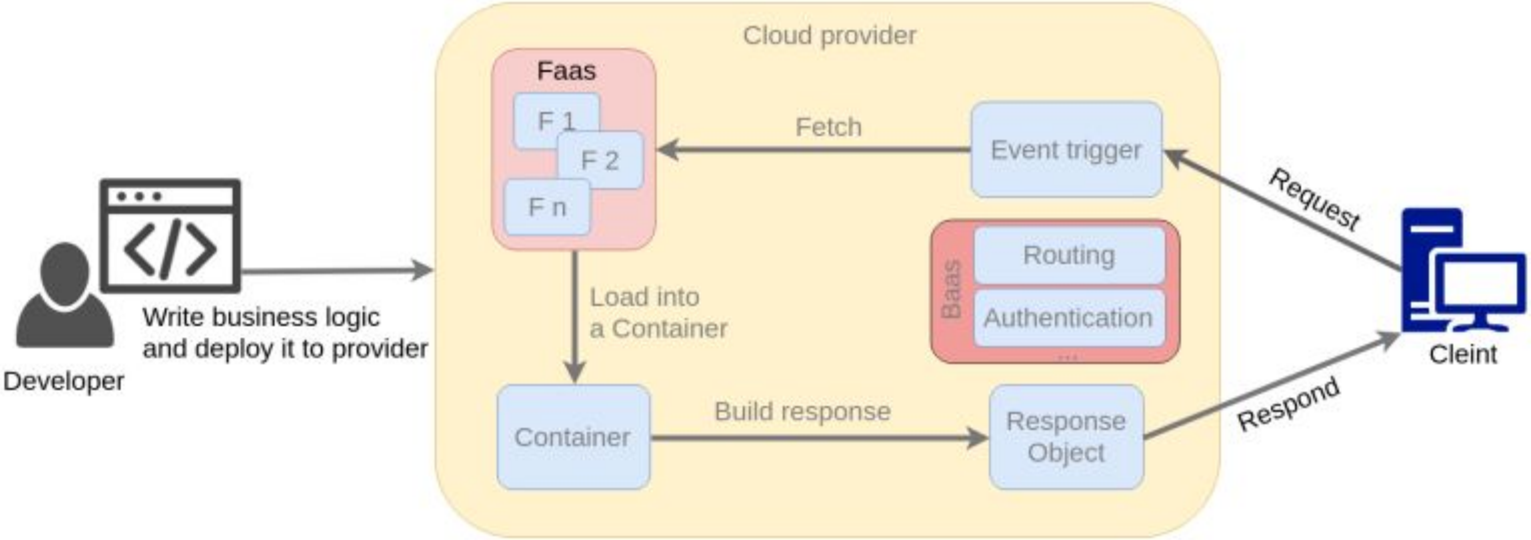


On Premise	IaaS	PaaS	FaaS	SaaS
Functions	Functions	Functions	Functions	Functions
Application	Application	Application	Application	Application
Runtime	Runtime	Runtime	Runtime	Runtime
Operating system	Operating system	Operating system	Operating system	Operating system
Virtualisation	Virtualisation	Virtualisation	Virtualisation	Virtualisation
Networking	Networking	Networking	Networking	Networking
Storage	Storage	Storage	Storage	Storage
Hardware	Hardware	Hardware	Hardware	Hardware

Legend

- Provider managed
- Customer managed
- On Premise
- Cloud Computing


Browser
GET/POST
Events
It's time !!
webhook
webhook
GitHub
DockerHub
FaaS
BaaS
Code
Storage
DB
output
SMS Provider
SMS


Cloud provider
Faas
F 1
F 2
F n
Fetch
Event trigger
Request
Baas
Routing
Authentication
...
Load into
a Container
Write business logic
and deploy it to provider
Developer
Container
Build response
Response
Object
Respond
Cleint

Use cases

- Trigger-based tasks
- Asynchronous processing
- IoT services
- Static website
- Building RESTful APIs(small api’s)
- Continuous Integration (CI) and Continuous Delivery (CD) (a commit tregers certain test functions…)
- …

Pros/Cons

Pros

- **Productivity**: Less server work (maintaining and managing)
- **Cost**: You pay in a per invocation basis
- **Autoscaling**

Cons

- **Cold start**: Slower performance after a time of inactivity.
- **Limited Control:** Over the software stack that code runs on.(limited options)
- **Vendor Lock-in:** Services from the same provider usually work good together.

Azure Functions

Supported languages

Java

C#

Node js

Python

TypeSctipt

.NET Core

F#

PowerShell

Plans

Consumption plan

✔ Pay only when your functions are running.

✔ Scales automatically

Premium plan

✔ Function apps run continuously

✔ High number of small executions and a high execution bill, but low GB seconds in the Consumption plan.

✔ More CPU/Memory

✔ Unlimited execution time

✔ More features: Virtual network connectivity.

✔A custom Linux image

Dedicated plan

✔ You have existing, underutilized VMs that are already running other App Service instances.

✔ Predictive scaling and costs are required.

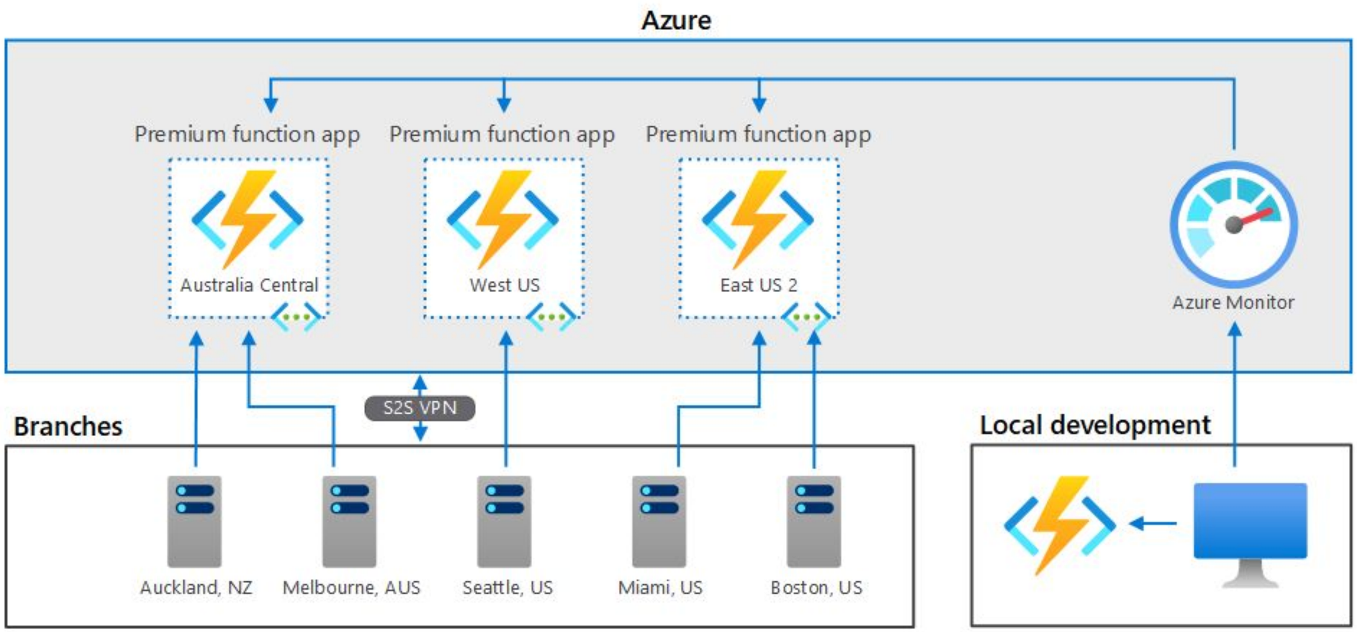
Plans Cont’d

	Consumption plan	Premium plan	Dedicated plan
Can use docker images	No	Yes	Yes
Maximum timeout	10 min	Unlimited	Unlimited
Maximum instances	200 windows 100 linux	100 windows 20-40 linux	10-20 Manual/autoscale
Cold start	Yes	Prewarmed instances	Run continuously
Billing	Based on number of executions, execution time, and memory used.	based on the number of core seconds and memory used across needed and pre-warmed instances.	You pay the same for function apps in an App Service Plan as you would for other App Service resources, like web apps.

Plans Cont’d

Feature	Consumption plan	Premium plan	Dedicated plan
Inbound IP restrictions and private site access	Yes	Yes	Yes
Virtual network integration	No	Yes	Yes
Virtual network triggers (non-HTTP)	No	Yes	Yes
Hybrid connections (Windows only)	No	Yes	Yes
Outbound IP restrictions	No	Yes	Yes

The Problem



Source Microsoft

Solutions

1- Run serverless OnPrem.

Use Core tools, Docker or Kubernetes(KEDA)

Solutions Cont’d

Pros:

- Faster development for developers using CLI.
- Faster network communication.
- Pricing might be cheap.

Cons:

- Extra overhead of managing services yourself.

Solutions Cont’d

2- Connect Azure Function to OnPrem network using Premium plan and VPN/ExpressRoute

- Premium plan makes sure all functions run within a specific subnet.
- Adjusting the firewall and connecting both Cloud and OnPrem.

Solutions Cont’d

Pros:

- Easier configuration.
- Usage of managed services out-of-the-box.

Cons:

- Cost.
- Speed.

Questions

Source Cleo

References

1- https://azure.microsoft.com/en-us/services/functions
2- https://docs.microsoft.com/en-us/azure/azure-functions/functions-scale
3- https://docs.microsoft.com/en-us/azure/architecture/hybrid/azure-functions-hybrid
4- https://landscape.cncf.io/serverless
5- https://docs.microsoft.com/en-us/azure/azure-functions/supported-languages

Thanks