.NET Conf

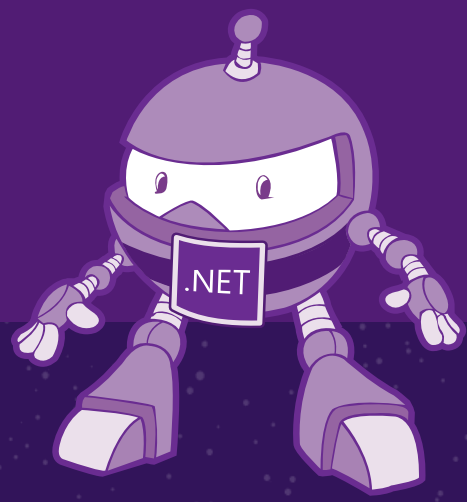
探索 .NET 新世界

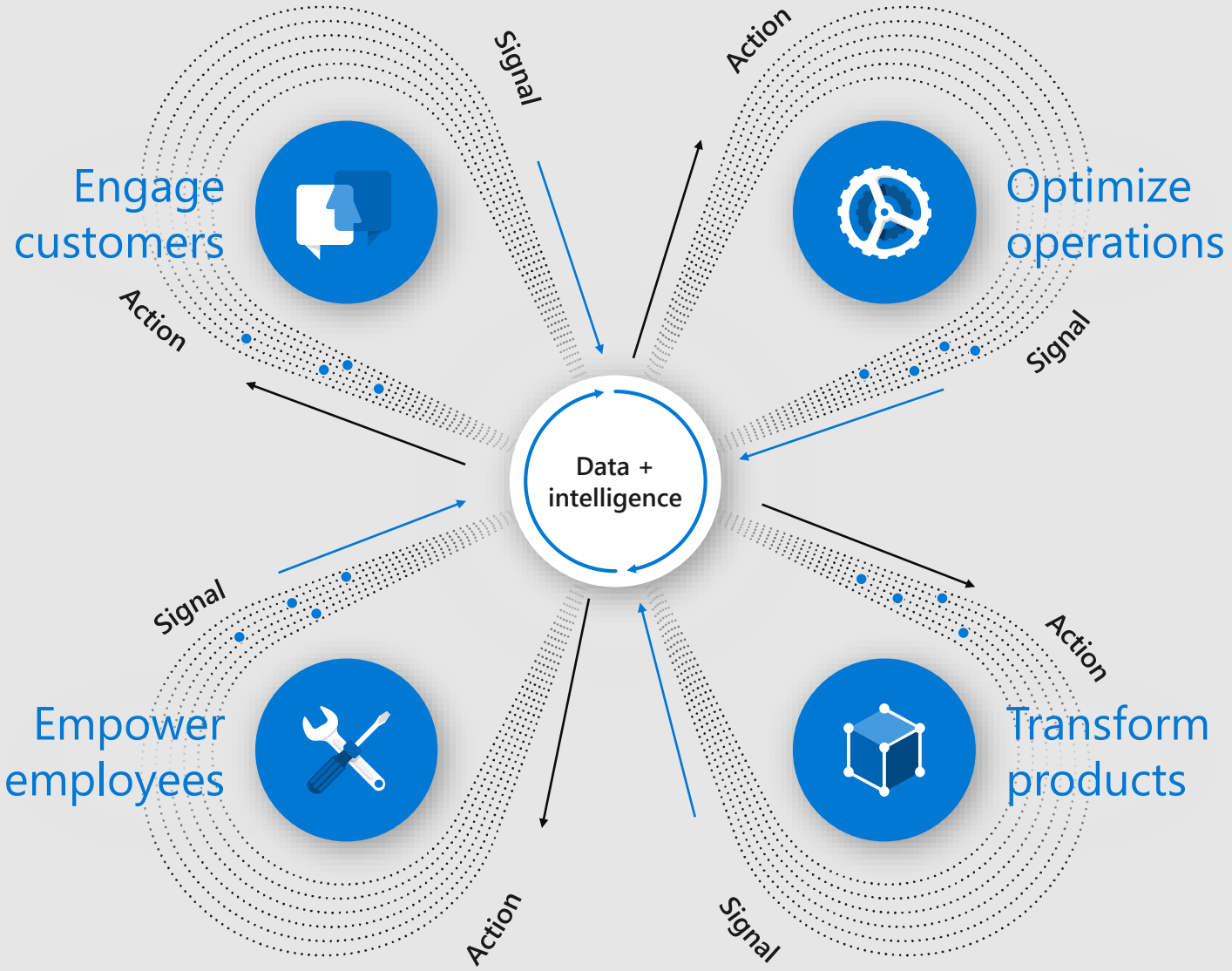
Host by

STUDY4

利用 .NET Core 在物聯網裝置上進行邊緣運算

John Chang
資深軟體開發協理
Microsoft





80B

Connected “things” by 2025 generating 180ZB of data

$130B

New monetization avenues due to IoT-related services

80%

Companies that increased revenue as a result of IoT implementation

$100M

Average increase in operating income (avg. 8%) among the most digitally transformed enterprises

However, IoT projects are complex

Security

IoT poses unique security, privacy, and compliance challenges

Complexity

Lack of IT/OT integration impedes efficiencies. Difficult to know where to start

Heavy up-front investments can be cost-prohibitive and costs unpredictable

Siloed Data

Large portions of the business are not digitized

Data is siloed across different parts of the company

Unlocking the value of IoT

The IoT opportunity across industries

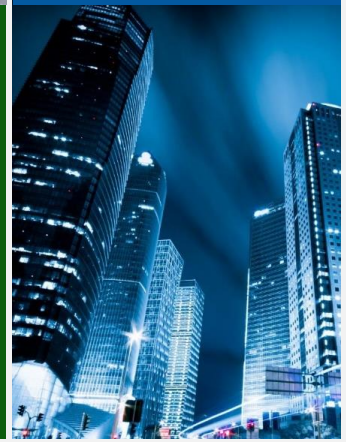
Energy
More efficient, cleaner power, and using less of it across industries

Smart Cities
More sustainable, prosperous, and economically competitive cities

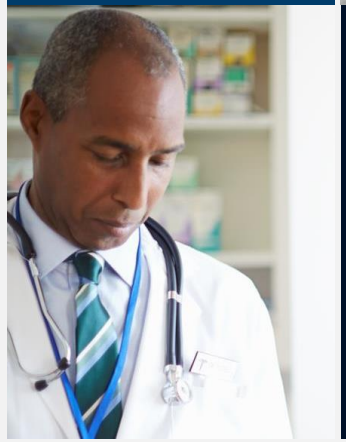
Healthcare
Improved quality and better outcomes for patients, anywhere

Retail
Better customer experiences
Now market opportunity

Transportation
People and goods moving reliably, more safely, and using less energy



Agriculture
Better yields and higher quality with fewer resources and less waste



Manufacturing
Realize efficiency, automation, customer centricity and tap into new revenue sources

Johnson Controls

Connected chillers come back online **9x faster** than unconnected equipment, avoiding more than **$300,000** in hourly downtime costs

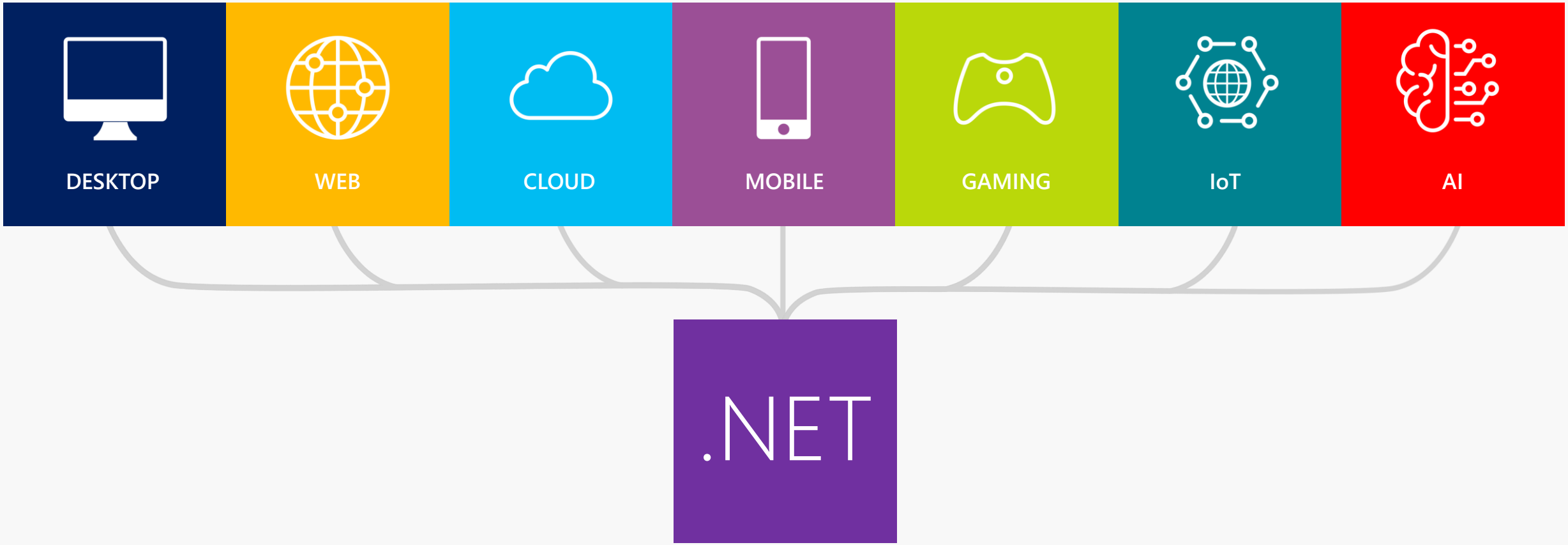
DUNAV NET

Keeping farmers informed about when to irrigate, how to control diseases, and how to fight pests, has led to **increased yields of 30%**, and a **20% reduction** in water use

ROLLS ROYCE Rolls-Royce

Rolls Royce provides maximize aircraft availability by employing “power by the hour” model; cutting fuel usage by 1 percent could save **$250,000** per plane per year

Your platform for building **anything**

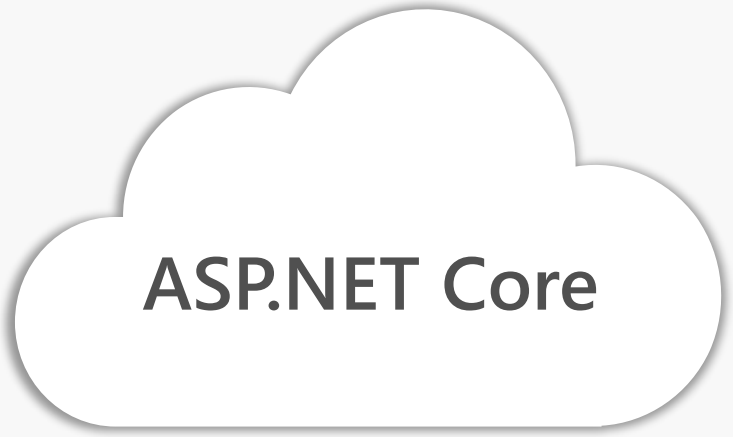


.NET Core 3.0: A full stack solution

Client

- Blazor
- Components
- SPA (JavaScript)

Frontend



- MVC / Razor Pages
- Web APIs
- SignalR
- Security & identity

Backend

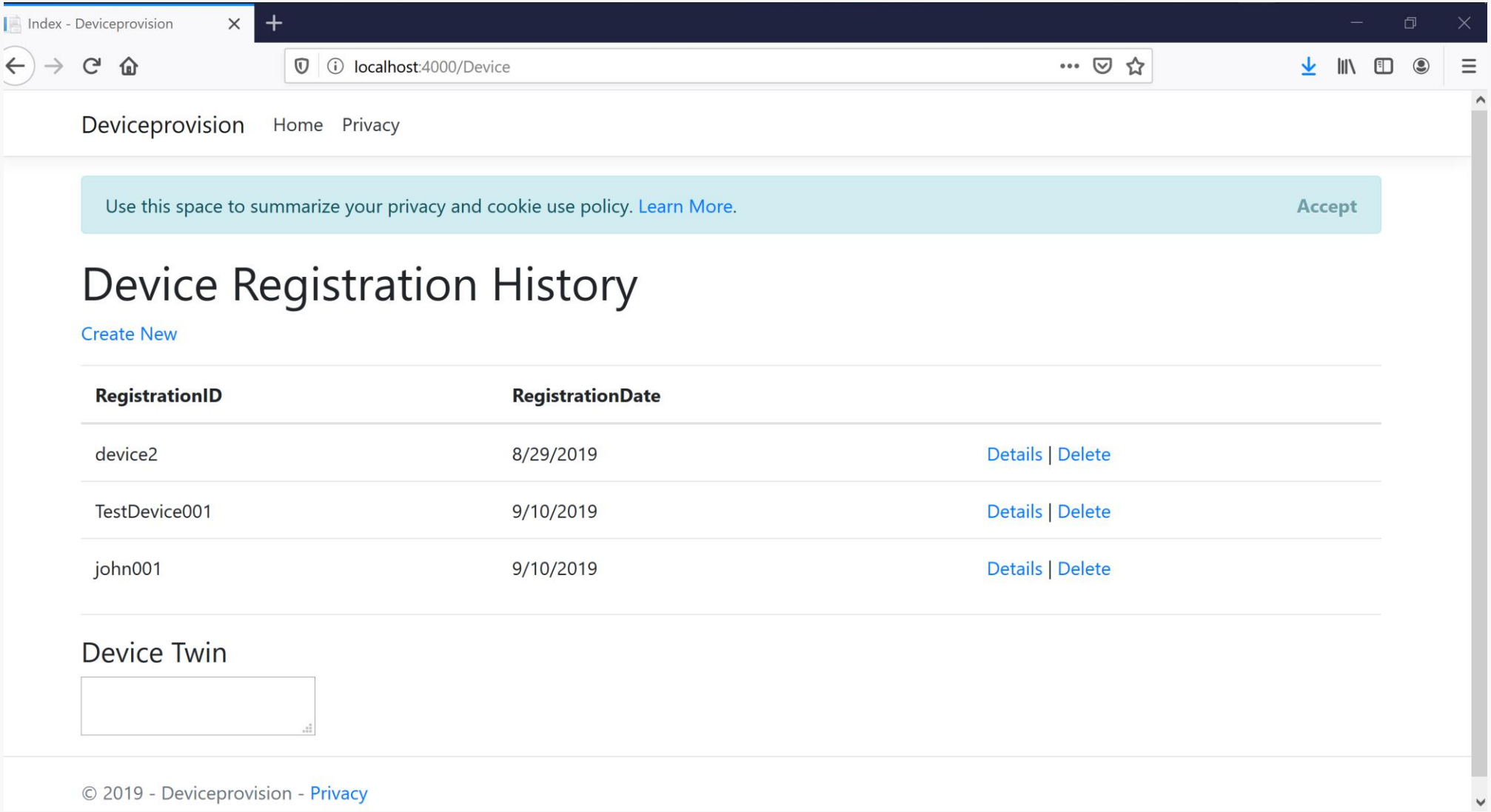
- Worker services
- gRPC

Also new in ASP.NET Core 3.0

Simplified shared framework
Blazor (server-side)
gRPC
Worker
IdentityServer
API code generation
Endpoint routing integration
C# 8 in Razor & MVC
JSON
Windows service support
*SignalR C++ client**
SignalR auto-reconnect, streaming
*Event counters**
*Certificate & Kerberos authentication**
Performance

**Coming soon!*

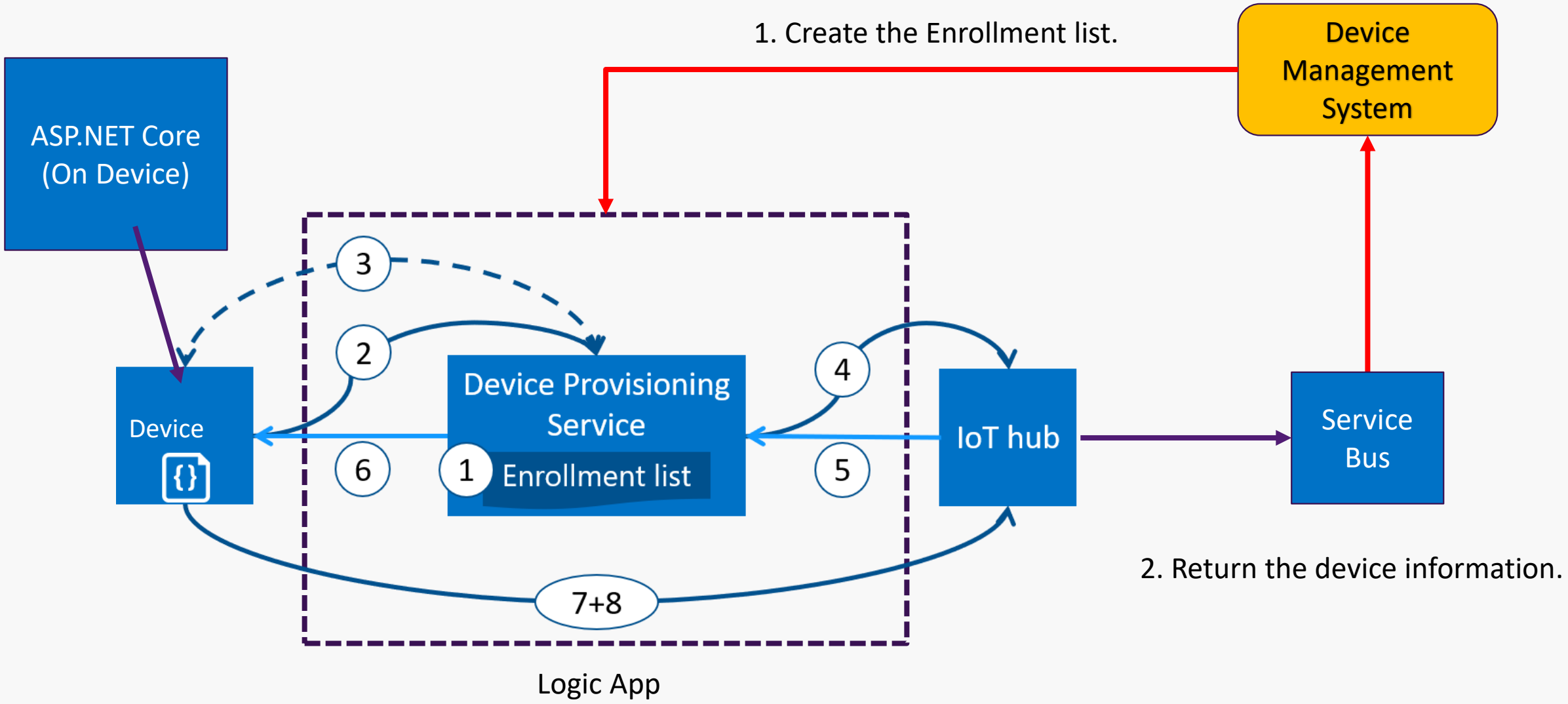
Let's build an device provision app!



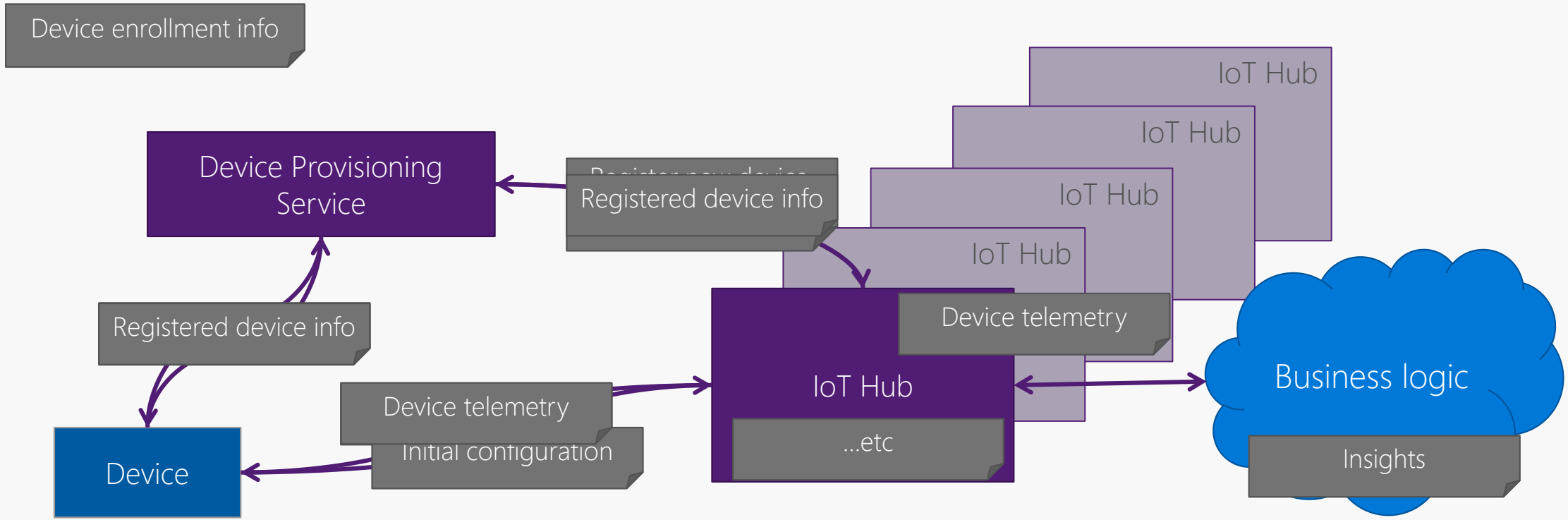
Understanding the Edge: Heavy Edge vs Light Edge

	Cloud: Azure	Heavy Edge				Light Edge		
Description	An Azure host that spans from CPU to GPU and FPGA VMs	A server with slots to insert CPUs, GPUs, and FPGAs or a X64 or ARM system that needs to be plugged in to work **Cloud Consistent Hybrid Server**		**Servers** / **PC class devices**	**Gateway**	A Sensor with a SOC (ARM CPU, NNA, MCU) and memory that can operate on batteries **Smart Sensors + Ambient AI**		**Sensors**
Example	DSVM / ACI / AKS / Batch AI	- DataBox Edge - HPE - Azure Stack	- DataBox Edge	- Industrial PC	-Video Gateway -DVR	-Mobile Phones -VAIDK	-Mobile Phones -IP Cameras	-Azure Sphere - Appliances
What runs model	CPU,GPU or FPGA	CPU,GPU or FPGA	CPU, GPU	x64 CPU	Multi-ARM CPU	Hw accelerated NNA	CPU/GPU	MCU

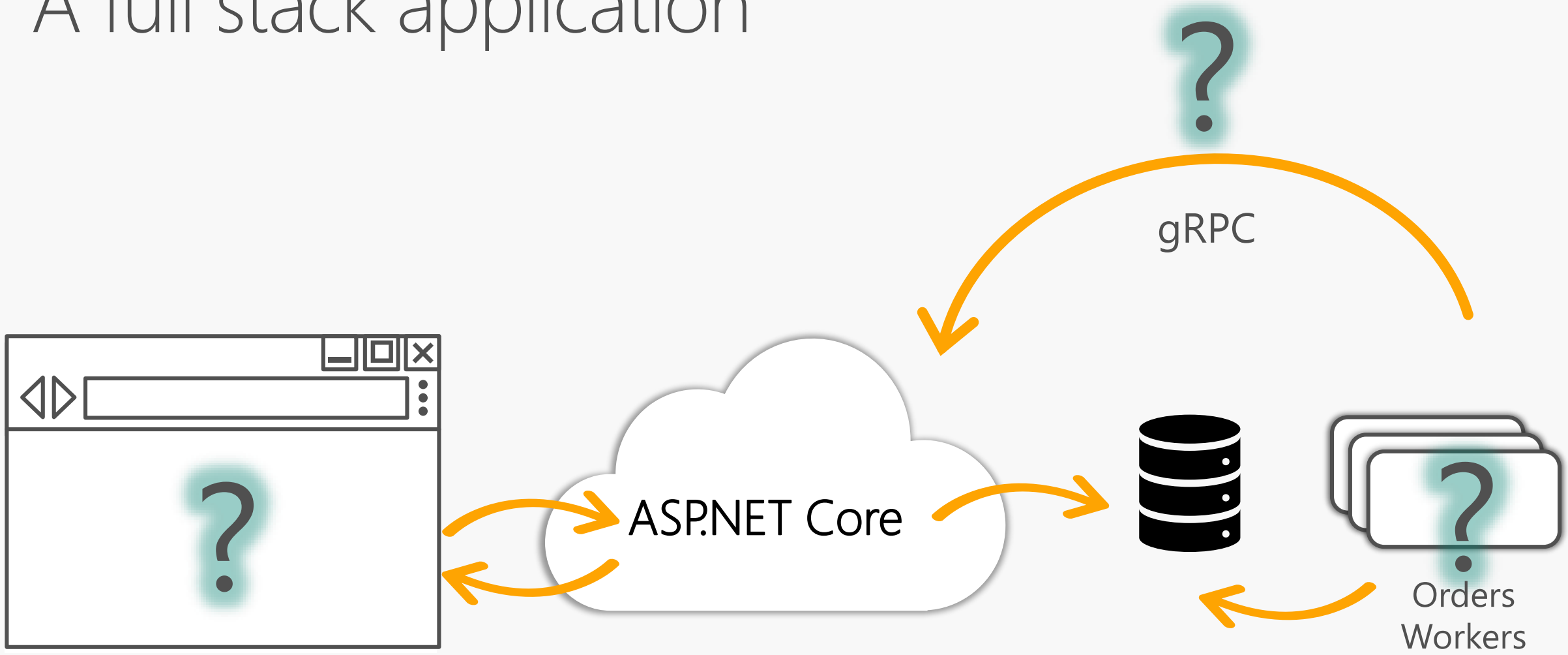
Automated Device Provisioning



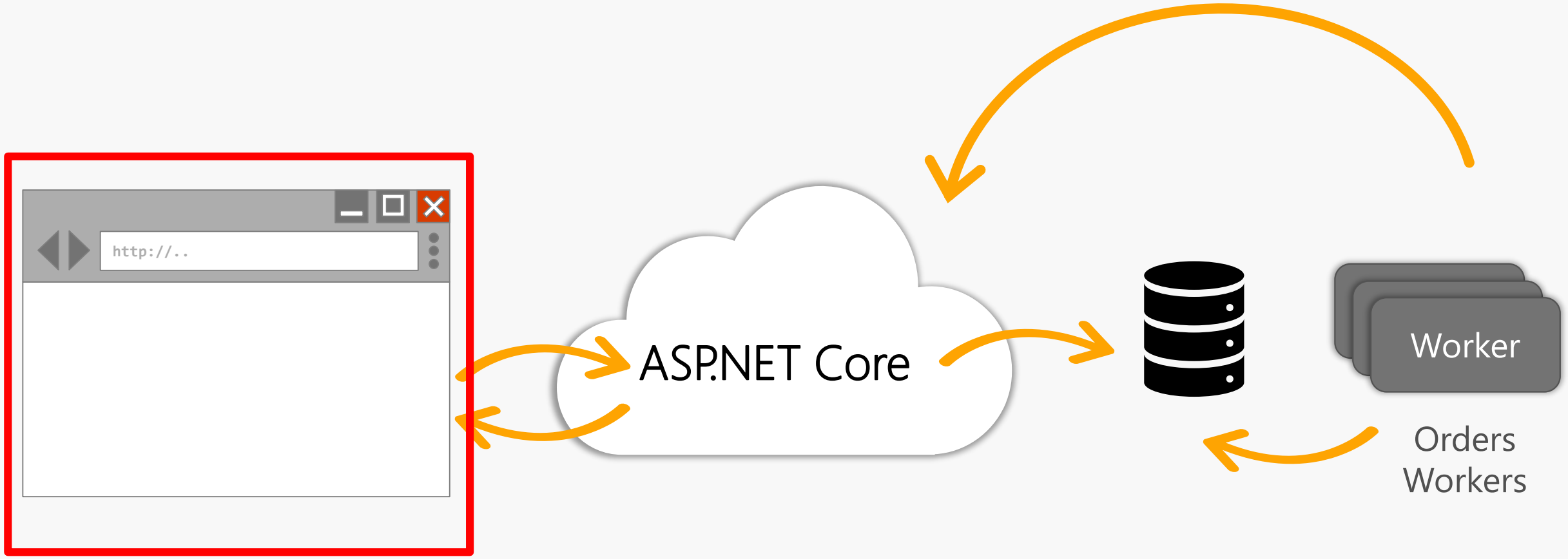
Provisioning with DPS



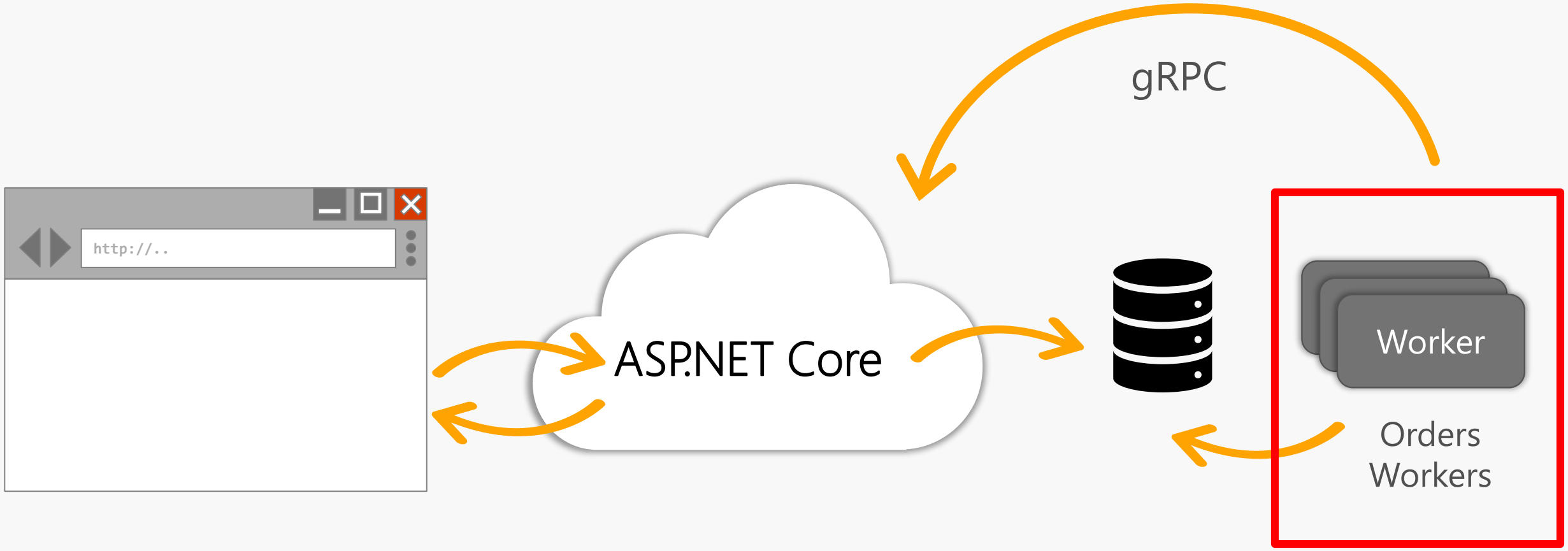
A full stack application



The frontend

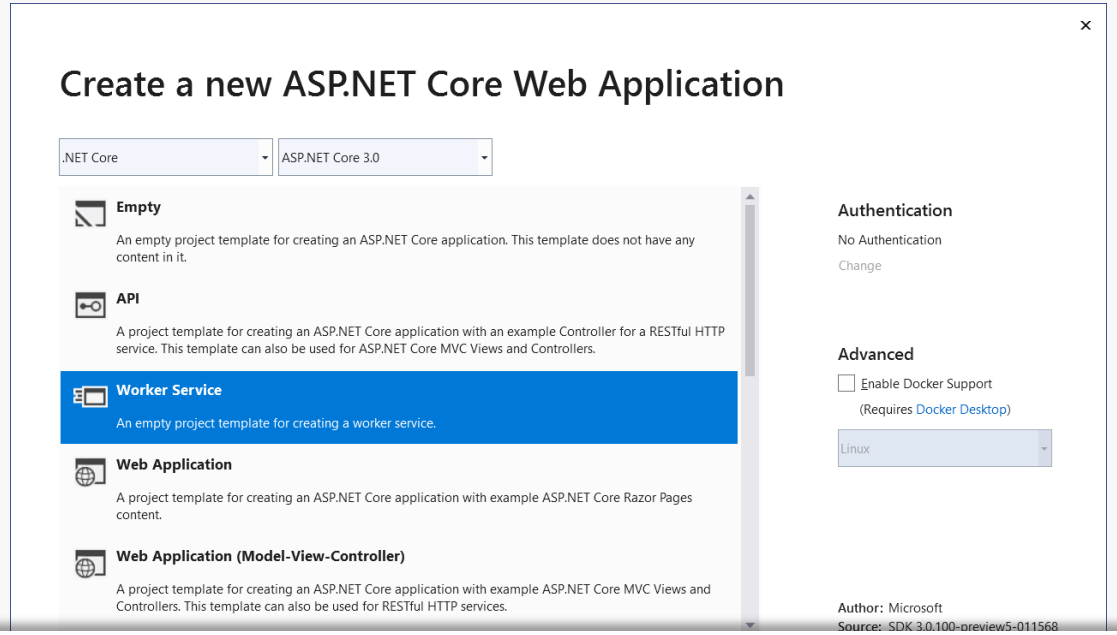


The worker



Worker services

- New Worker service template
- Build long-running worker processes
- May or may not have endpoints
- Host in Windows services, systemd, WebJobs, containers
- Integrates with configuration, logging, dependency injection



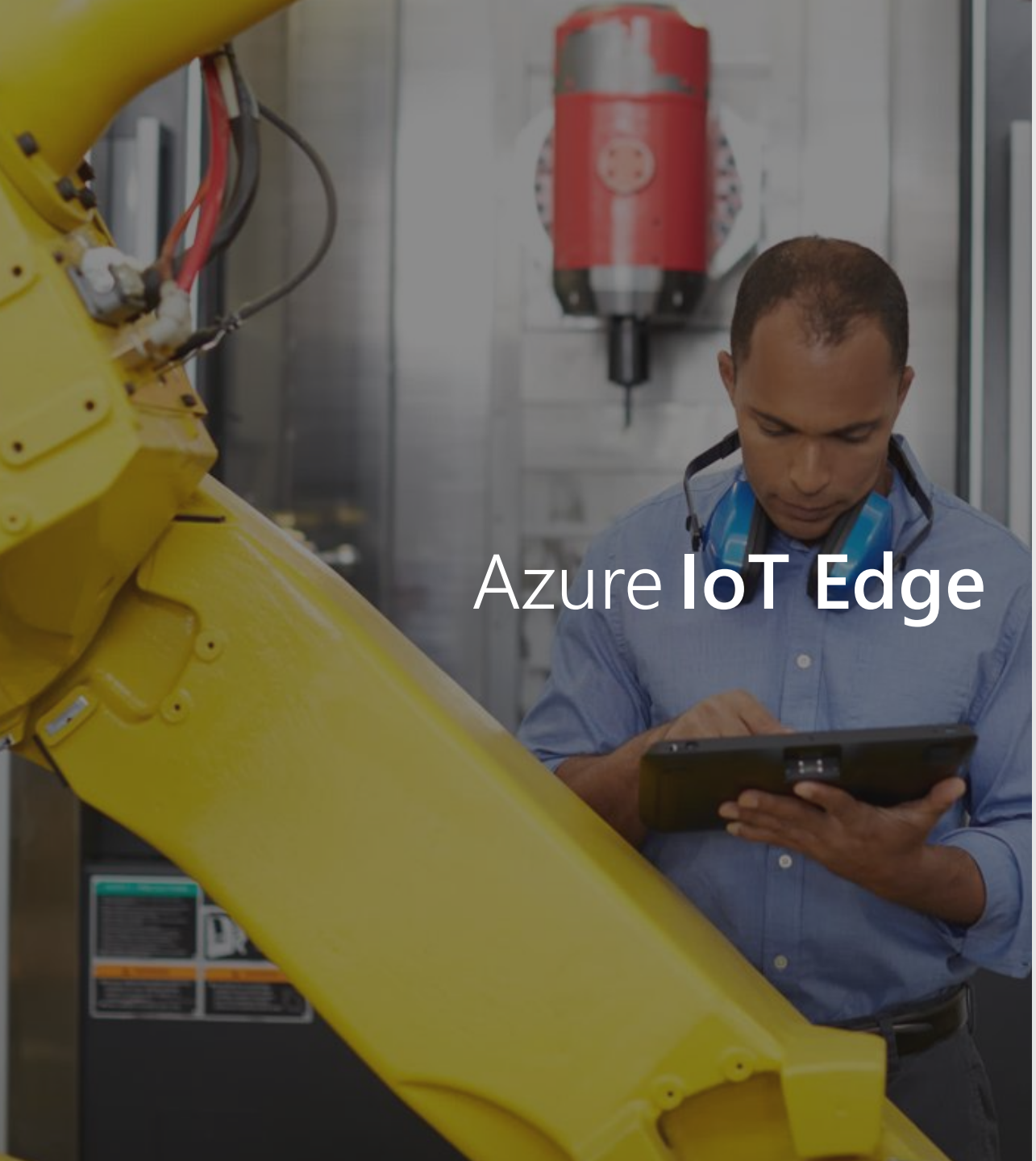

```
public class Worker : BackgroundService
{
    private readonly ILogger<Worker> _logger;

    public Worker(ILogger<Worker> logger)
    {
        _logger = logger;
    }

    protected override async Task ExecuteAsync(CancellationToken stoppingToken)
    {
        while (!stoppingToken.IsCancellationRequested)
        {
            _logger.LogInformation("Worker running at: {time}", DateTimeOffset.Now);
            await Task.Delay(1000, stoppingToken);
        }
    }
}
```

Demo –

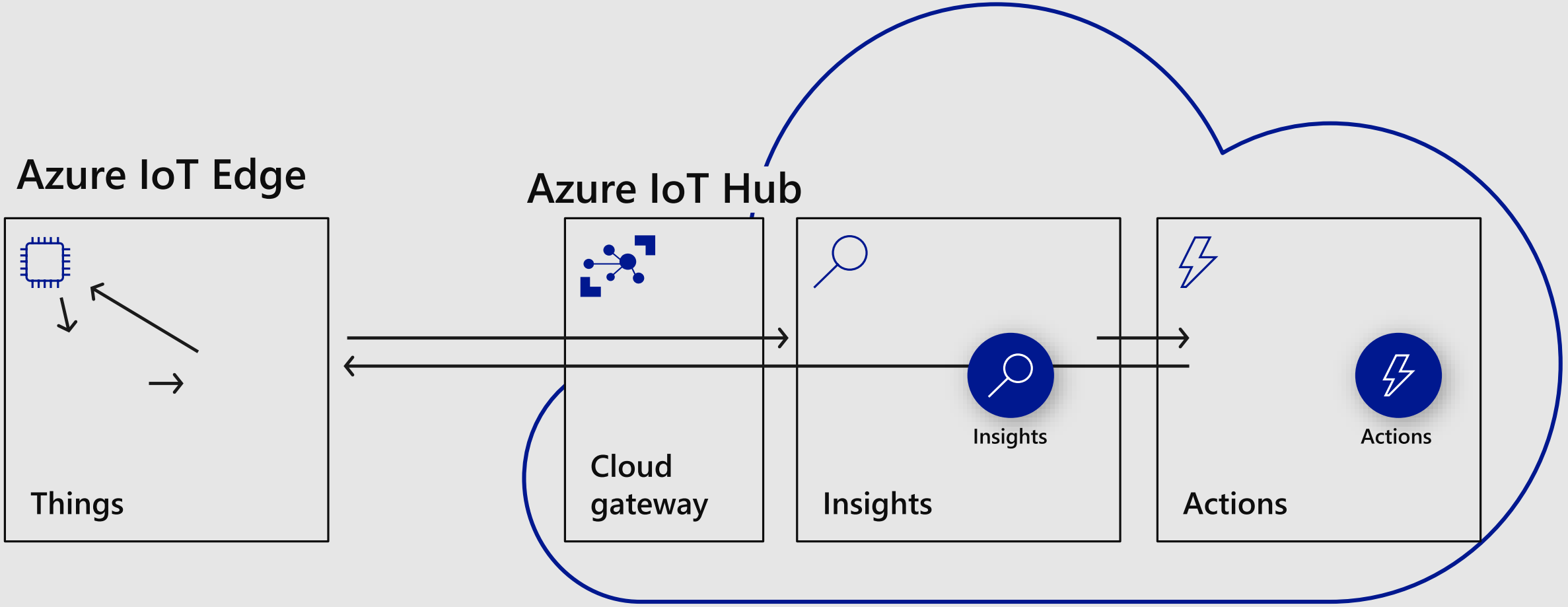
利用 .NET Core 開發與部署裝置應用程式



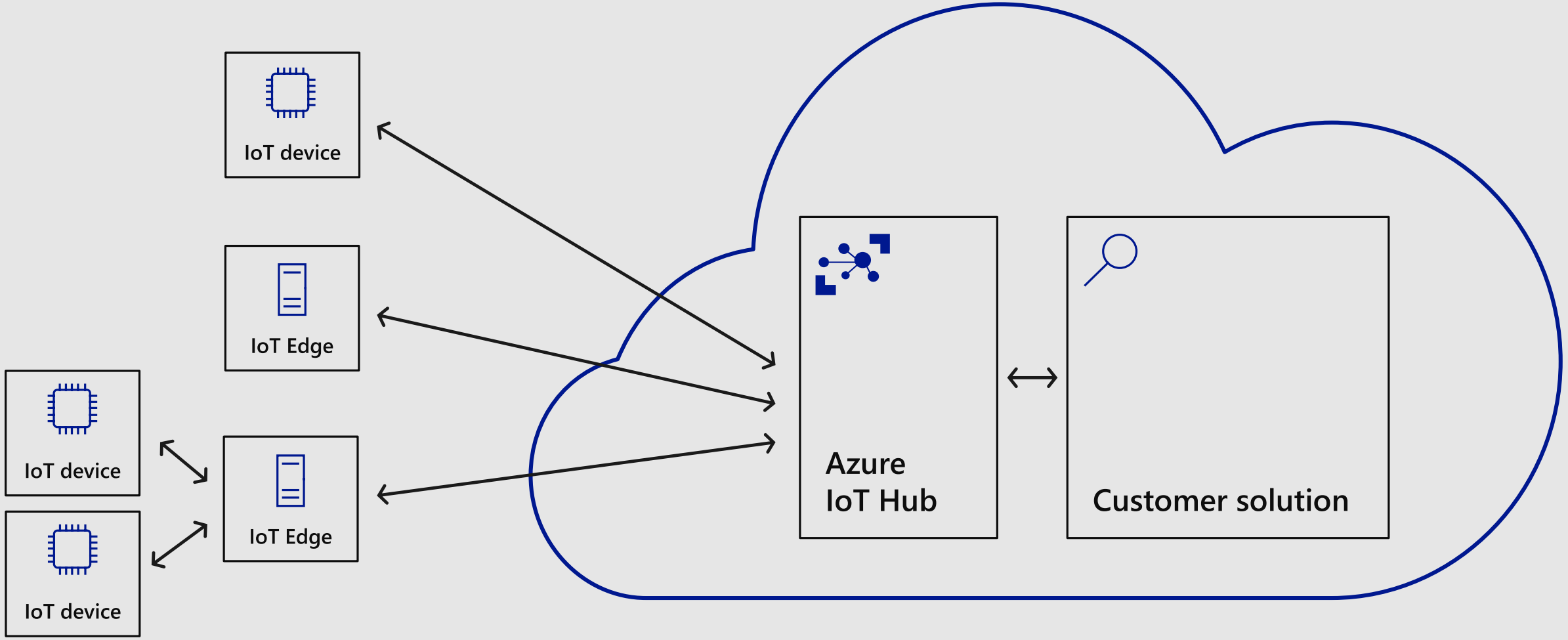
Azure **IoT Edge**

- Move cloud and custom workloads to the edge, securely
- Seamless deployment of AI and advanced analytics
- Configure, update and monitor from the cloud
- Compatible with popular operating systems
- Code symmetry between cloud and edge for easy development and testing
- Secure solution from chipset to cloud

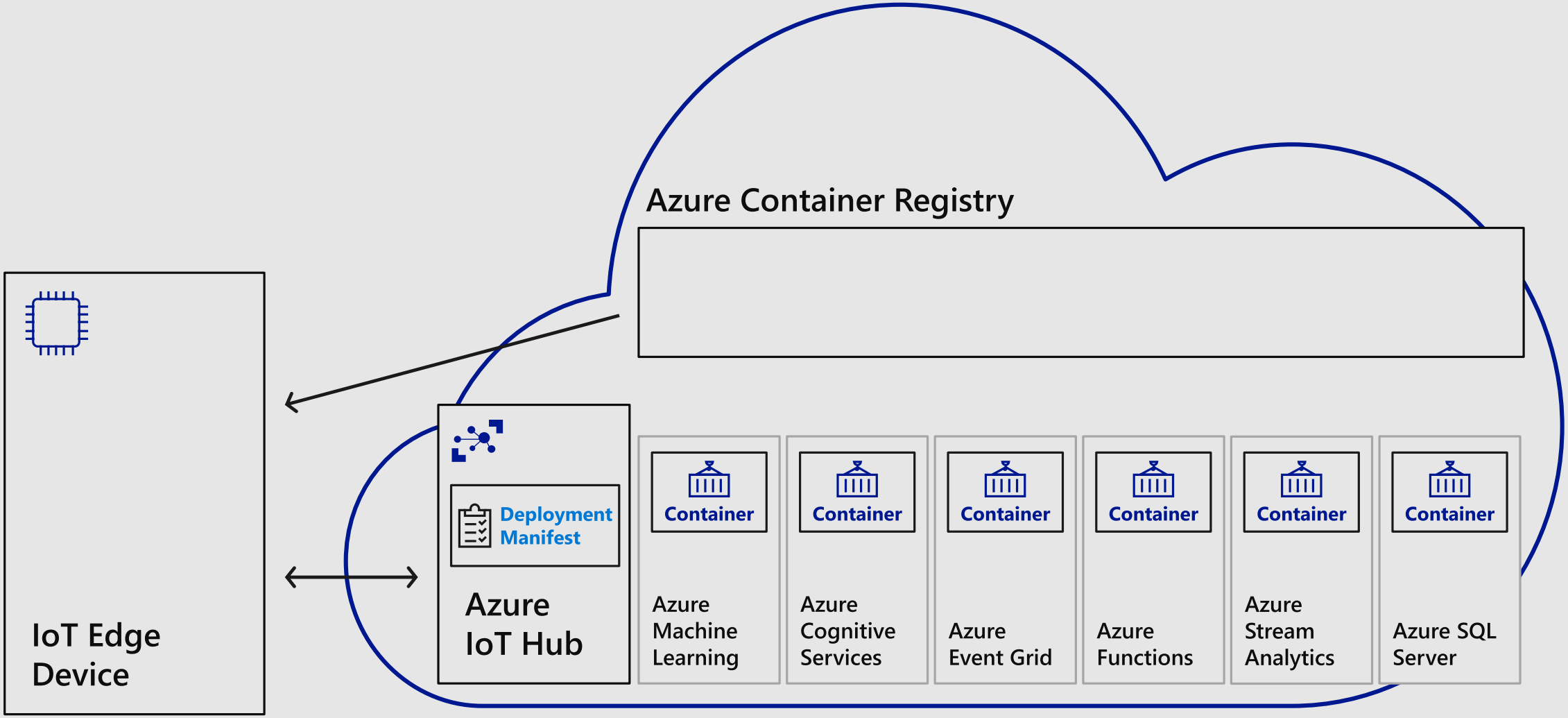
IoT pattern + edge



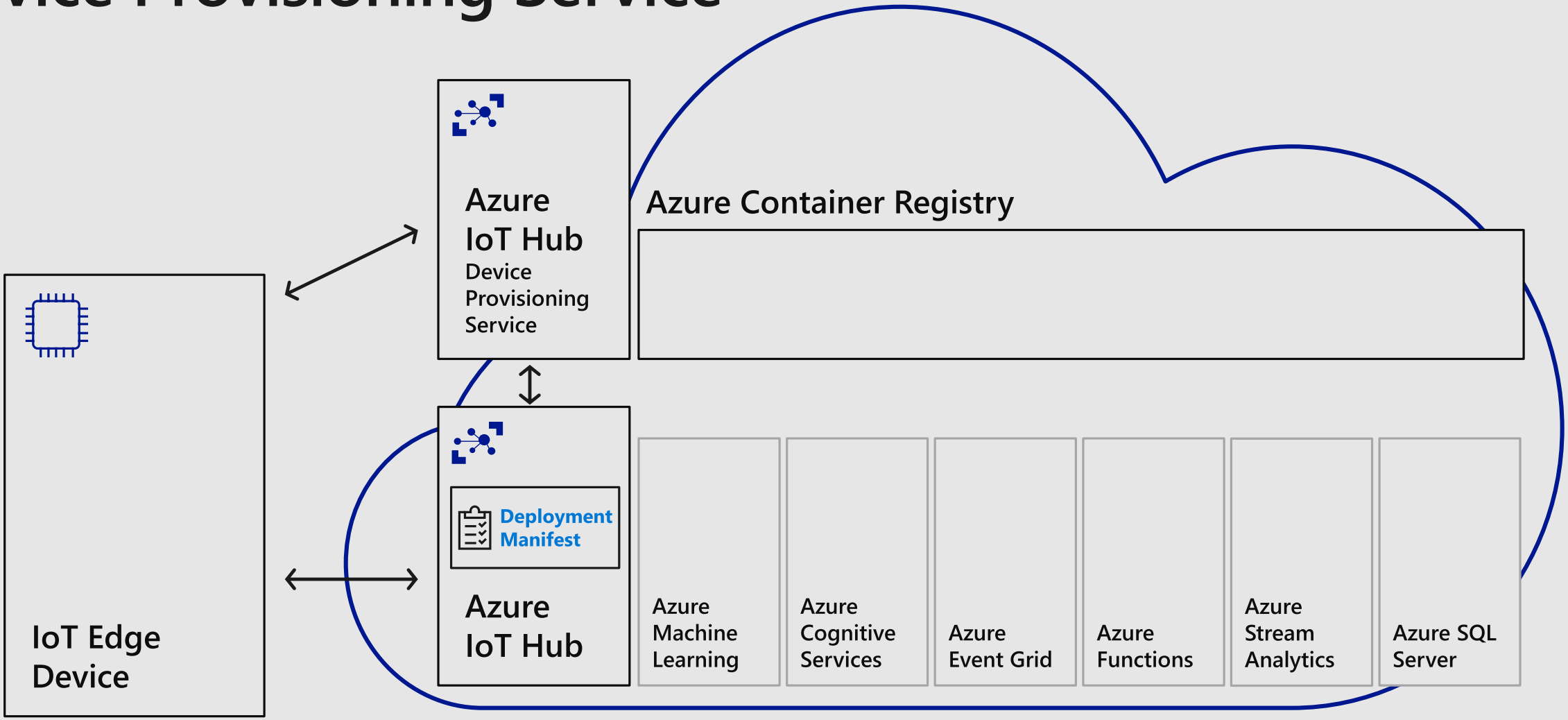
High level topology



Azure IoT Edge deployment



Azure IoT Edge deployment + Azure IoT Hub Device Provisioning Service



Azure IoT Edge

Vision AI Developer Kit

QUALCOMM

Preregister now: https://visionaidevkit.com/

Schneider Electric

Edge analytics makes remote asset management easier

Schneider Electric was interested in enhancing their remote management solution to do more than just respond to real-time situations. It has now the flexibility to run machine learning in the cloud or at the edge.

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