Witekio
AN AVNET COMPANY

A Heavy AWS User's Firstlook at Azure

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I've used too many tools:

- AWS, Azure
- GCP, Alibaba, Tencent
- Algolia, Stripe, Auth0, Vercel, Netlify…

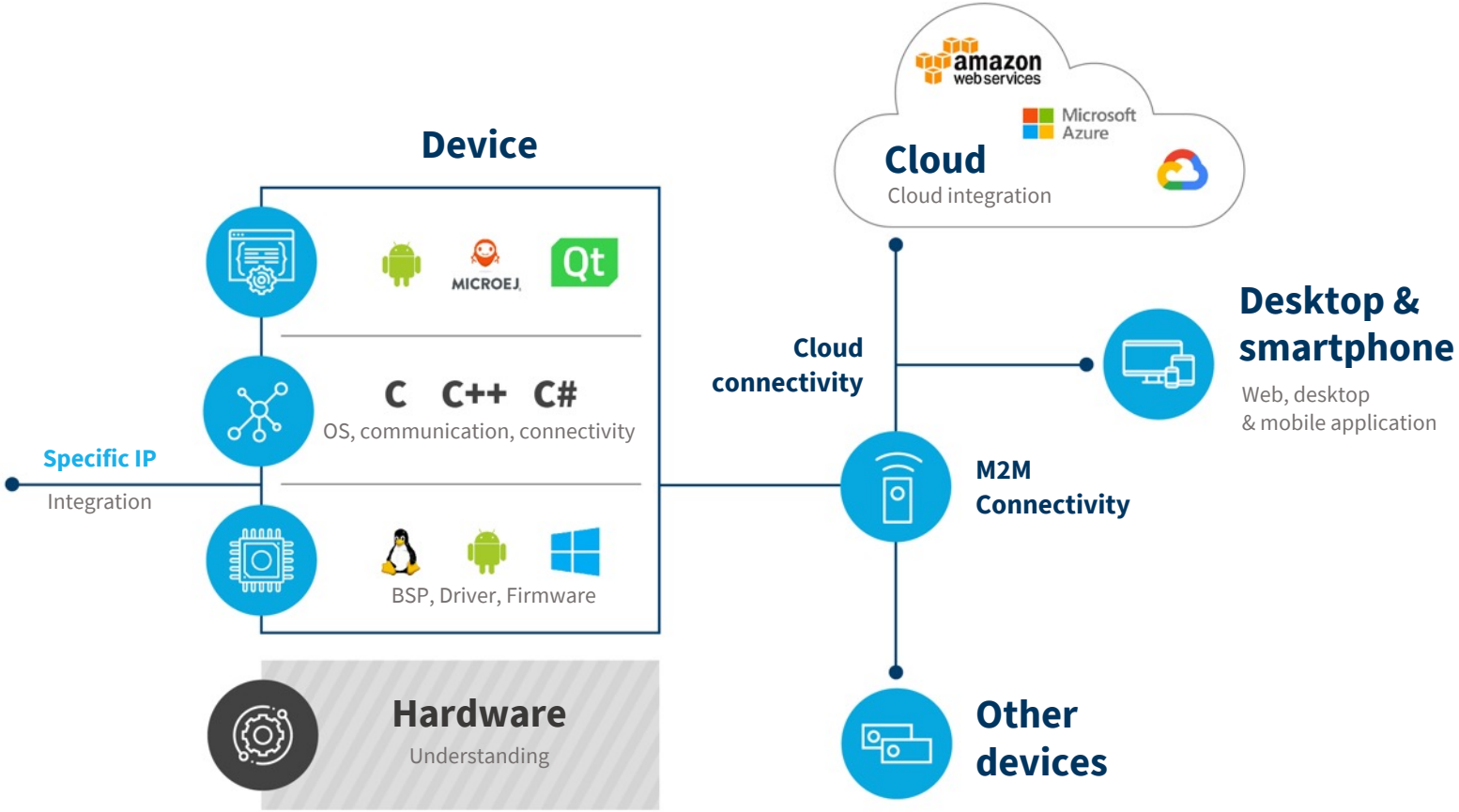
Work:

- I help IoT folks leverage the cloud

Lead Cloud Architect

linkedin.com/in/fmc-sea

Software independence



Fernando
@fmc_sea

Someone please, why do you signup for #Azure "Subscriptions" that you don't have recurring fees for?

And why are "accounts" not something you sign into?

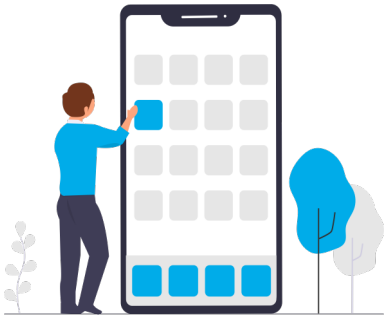
Summary

1. Introduction
2. Compute
3. Storage
4. IoT
5. Cloud Cost Optimization
6. Questions

1.

Introduction

What’s the Big Deal about Picking a Cloud?



- **Huge commitment for new companies**
- **Infrastructure cost and feature set can be critical for software businesses**

Mythbusting:

We need to
use the cloud.

Do you?

We’re not Dropbox though…

Building without “A Big Cloud”

Mythbusting:

We can’t
use the cloud.

Azure Compliances:

Global	US Government	Region / Country Specific		Industry Specific	
CIS Benchmark	CJIS	BIR 2012 (Netherlands)	IT-Grundschutz (Germany)	23 NYCRR 500 (US)	GLBA (US)
CSA STAR Attestation	CNSSI	C5 (Germany)	LOPD (Spain)	AFM/DNB (Netherlands)	GxP
CSA STAR Certification	DFARS	CS Mark Gold (Japan)	MeitY (India)	AMF/ACPR (France)	HIPAA (US)
CSA STAR Self-Assessment	DoD L 2,4,5	Cyber Essentials Plus (US)	MTCS Level 3 (Singapore)	APRA (Australia)	HITRUST (US)
ISO 20000	DoE 10	DJCP (China)	My Number Act (Japan)	CDSA	KNF (Poland)
ISO 22301	EAR	EN 301 549 (EU)	New Zealand CC Framework	CFTC 131 (US)	MARS-E (US)
ISO 27001	FDA CFR Title 21	ENISA IAF (EU)	PASF (UK)	DPP (UK)	MAS/ABS (Singapore)
ISO 27017	FedRAMP	ENS (Spain)	PIPEDA (Canada)	EBA (EU)	MPAA (US)
ISO 27701	FIPS 140-2	EU Model Clauses	PDPA (Argentina)	FACT (UK)	NBB/FSMA (Belgium)
ISO 27018	IRS 1075	EU-US Privacy Shield	TISAX (Germany)	FCA/PRA (UK)	NEN 7510 (Netherlands)
ISO 9001	ITAR	GB 18030 (China)	TRUCS (China)	FERPA (US)	NERC
SOC 1,2,3	NIST CSF	G-Cloud OFFICIAL (UK)		FFIEC (US)	OSFI (Canada)
WCAG 2.0	NIST 800-171	GDPR		FINMA (Switzerland)	PCI DSS

AWS Compliances:

Americas

CJIS
Criminal Justice Information Services

DoD SRG
DoD Data Processing

FedRAMP
Government Data Standards

FERPA
Educational Privacy Act

FIPS
Government Security Standards

FISMA
Federal Information

GxP
Quality Guidelines

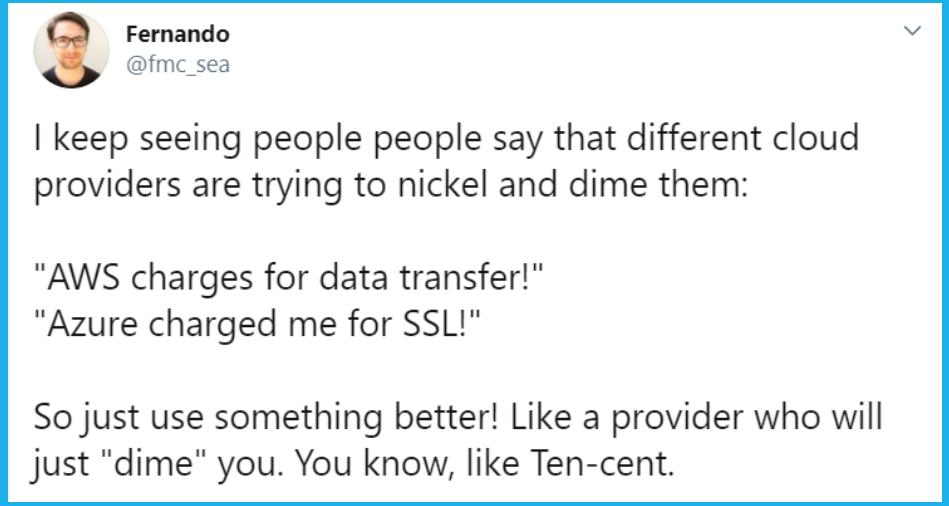
HIPAA
Protected Health

HITRUST CSF
Health Information

ITAR
International Arms

Mythbusting:

Moving to the cloud will **save money.**



Cloud resources can be spun up and down.

People need to eat.

Mythbusting:

We need to be
multi-cloud!

What does “Multi-cloud” mean?

“We run some apps in Azure and some in AWS”

vs.

“We can move our business between AWS and Azure at any time”

“We can move our business between AWS and Azure at any time”

When CloudA has an outage we'll be ready

Ooops. DNS was only in CloudA

Using two clouds means we can hire folks with either CloudA or CloudB experience!

Our team now needs to learn two clouds exceptionally well

Mythbusting:

We need to worry about **lock-in.**

If we invest too heavily in one cloud we will end up paying way more

Writing your applications for two clouds will be more costly

We need to only use VMs and containers so we can switch to any cloud at a moments notice

Never leveraging managed services will make developing applications much harder

Why AWS and Azure?

Top Two Public Clouds

- 2018 ZDnet - #1: AWS, #2: Azure
- 2019 Gartner - #1: AWS, #2: Azure
- 2020 ZDnet - #1: AWS, #2: Azure

Other Options

- Google Cloud (frequently in third)
- Other Cloud Providers

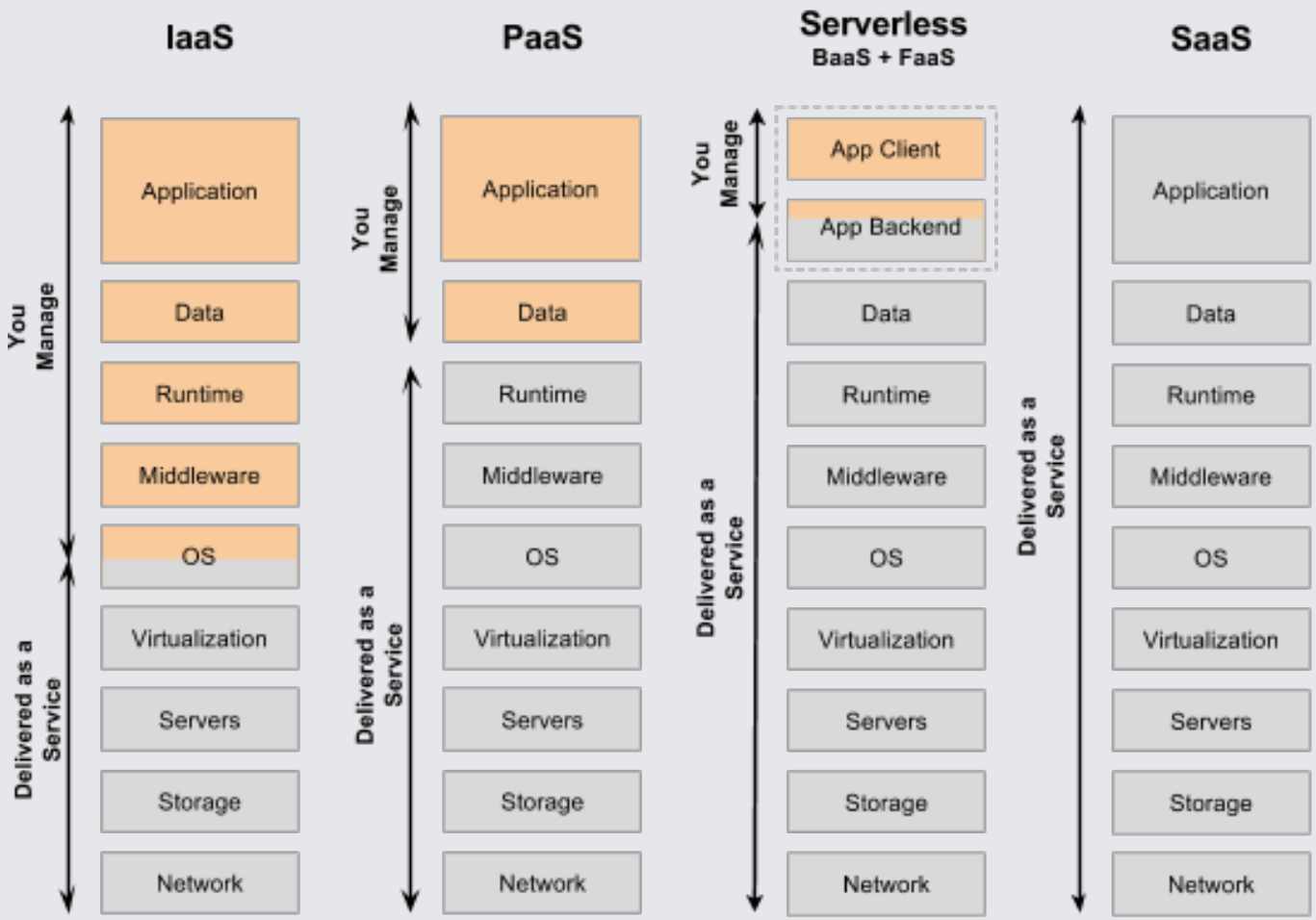
Why AWS and Azure?

AWS IoT

Azure IoT

2.

Compute



https://specify.io/concepts/serverless-baas-faas

The Compute Infrastructure Spectrum

IaaS

- Azure Virtual Machines
- Amazon EC2
- Networking services

PaaS

- AWS Elastic Beanstalk
- Azure App Services

Serverless

- Compute:
  - AWS Lambda
  - Azure Functions

IaaS Head to Head:
General Purpose Linux Virtual Machines

Cloud	Instance Type	vCPUs	RAM	Hourly Price
Azure	A2 v2	2	4 GiB	$0.076
Azure	B2S	2	4 GiB	$0.0416
AWS	a1.large	2	4 GiB	$0.051
AWS	t3a.medium	2	4 GiB	$0.0376

*This is a tiny subset of all the instance types either cloud offers

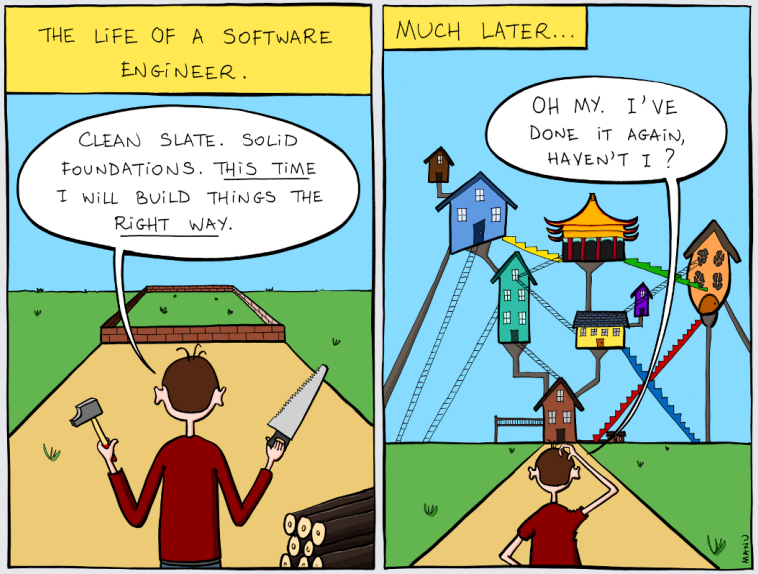
What doesn’t this address?

Detailed differences in instance types

What doesn’t this address?

Windows licensing with Azure

PaaS Comparison:



Elastic Beanstalk

"Where did all these resources come from and why is my bill $200?"

Azure App Service

Bonus! CaaS (Containers as a Service)

Elastic Container Service

Azure Container Service

Elastic Kubernetes Service

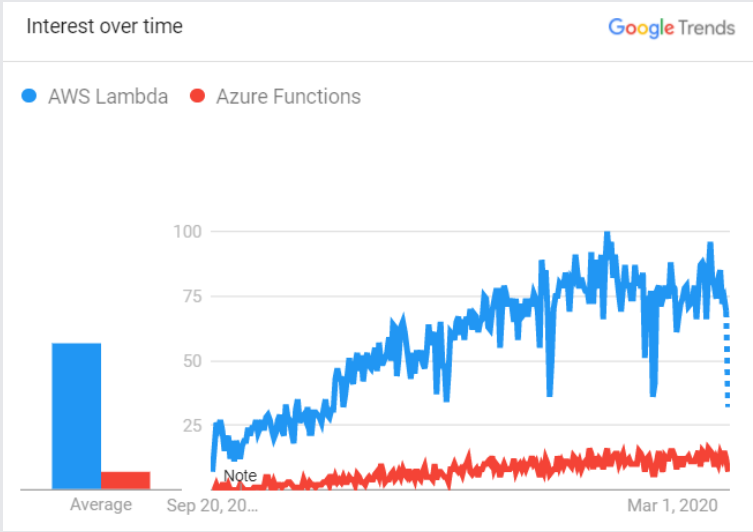
Azure Kubernetes Service

kubernetes

FaaS Growth

AWS Lambda

Azure Functions



FaaS Development Frameworks

AWS Lambda

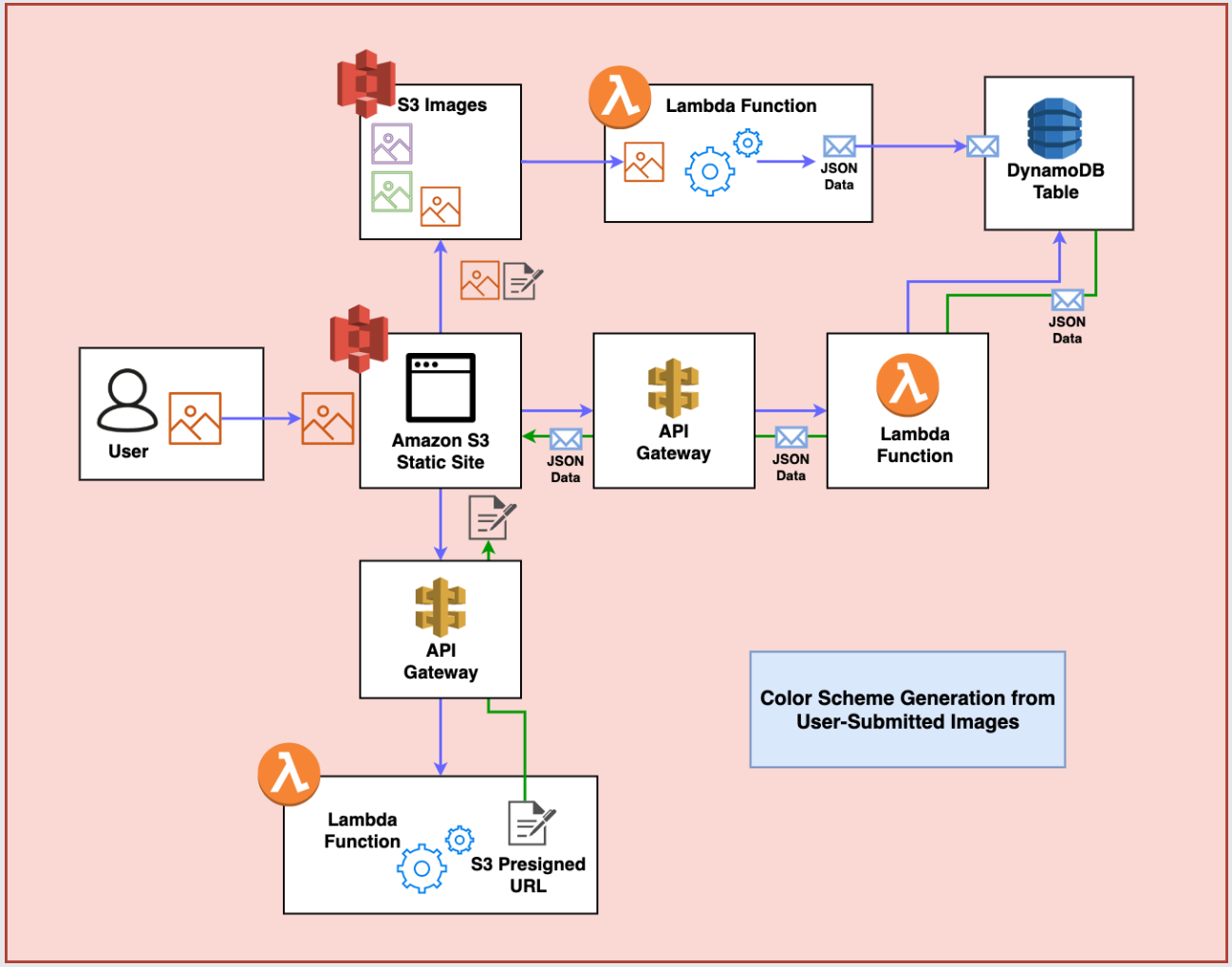
Azure Functions

AWS SAM

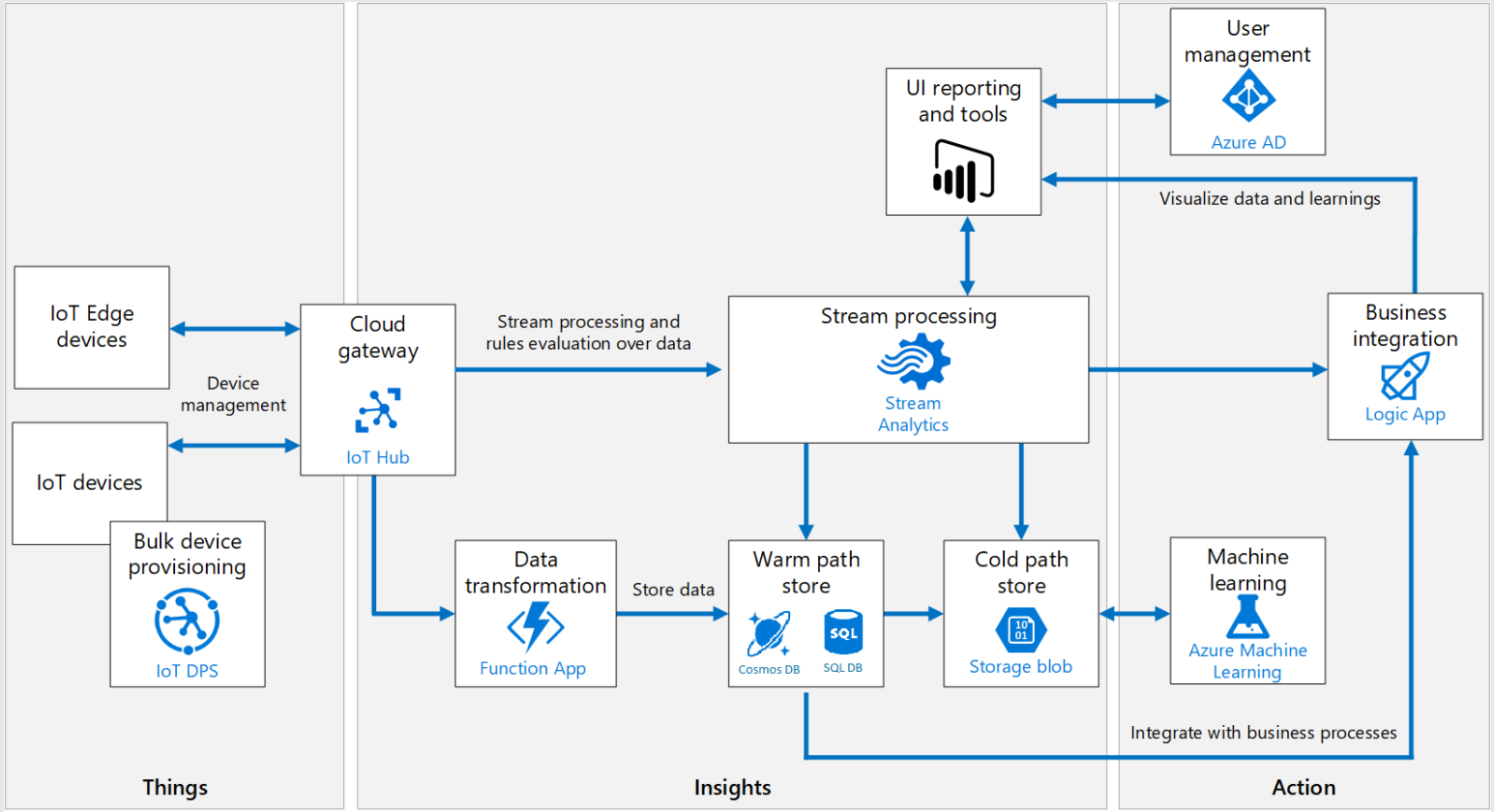
AWS Amplify

serverless

FaaS Capabilities: HTTP APIs



FaaS Capabilities – Data Processing



Compute Takeaways

- Comparable Compute Costs
- Pass on AWS PaaS
- Azure Functions still need some gumption(s?)

3.

Storage

The Storage Infrastructure Spectrum

IaaS

- Azure Virtual Machines
- Amazon EC2
- Host your own databases

PaaS

- AWS Relational Database Service
- Amazon Redshift
- Azure Databases

Managed Services

- Amazon DynamoDB
- Amazon S3
- Azure Cosmos DB
- Azure Blob Storage

IaaS Database Comparison:

Do you really want to host your own database servers?

PaaS SQL Databases

Amazon RDS

ORACLE

Microsoft SQL Server

MySQL

PostgreSQL

MariaDB

Azure Databases

Amazon Aurora

Azure SQL

Managed ‘NoSQL’ Databases

DynamoDB

Purely HTTP Interfaces and SDKs

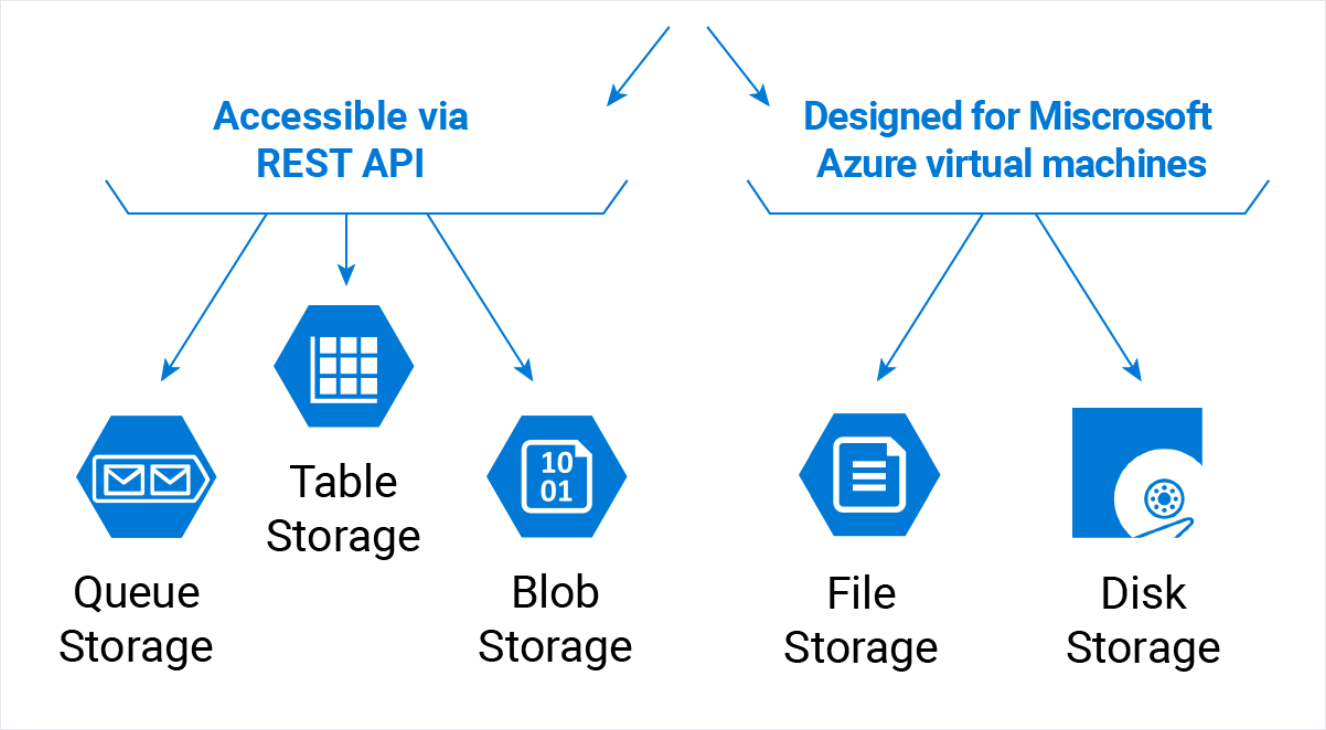
Design constraints to provide consistent latency

CosmosDB

Multiple interfaces (including SQL – traitor!)

Flexibility to leverage multiple APIs and business use cases

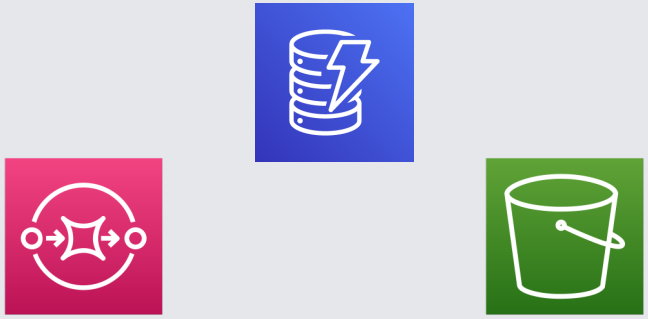
Azure Storage Accounts



https://www.msp360.com/resources/blog/microsoft-azure-storage-types-explained/

AWS Storage Services

Primarily HTTP Interfaces



Simple Queue Service
DynamoDB,
Simple Storage Service

Storage for Virtual Machines

Elastic File System (EFS)
Elastic Block Store (EBS)

Storage Takeaways

- Learn to love managed databases
- Managed storage is the standard
- Azure Storage Accounts correlate with multiple AWS services

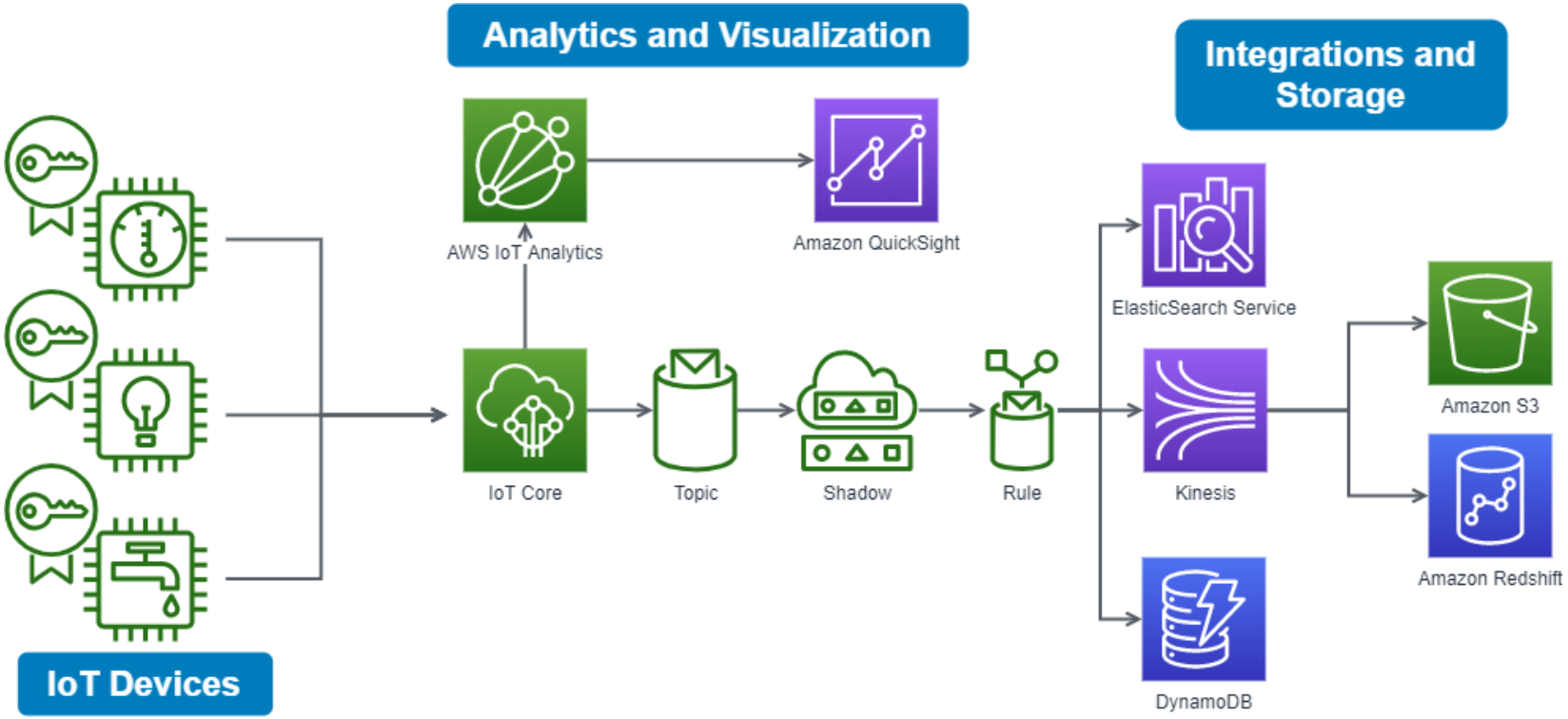
4.

IoT

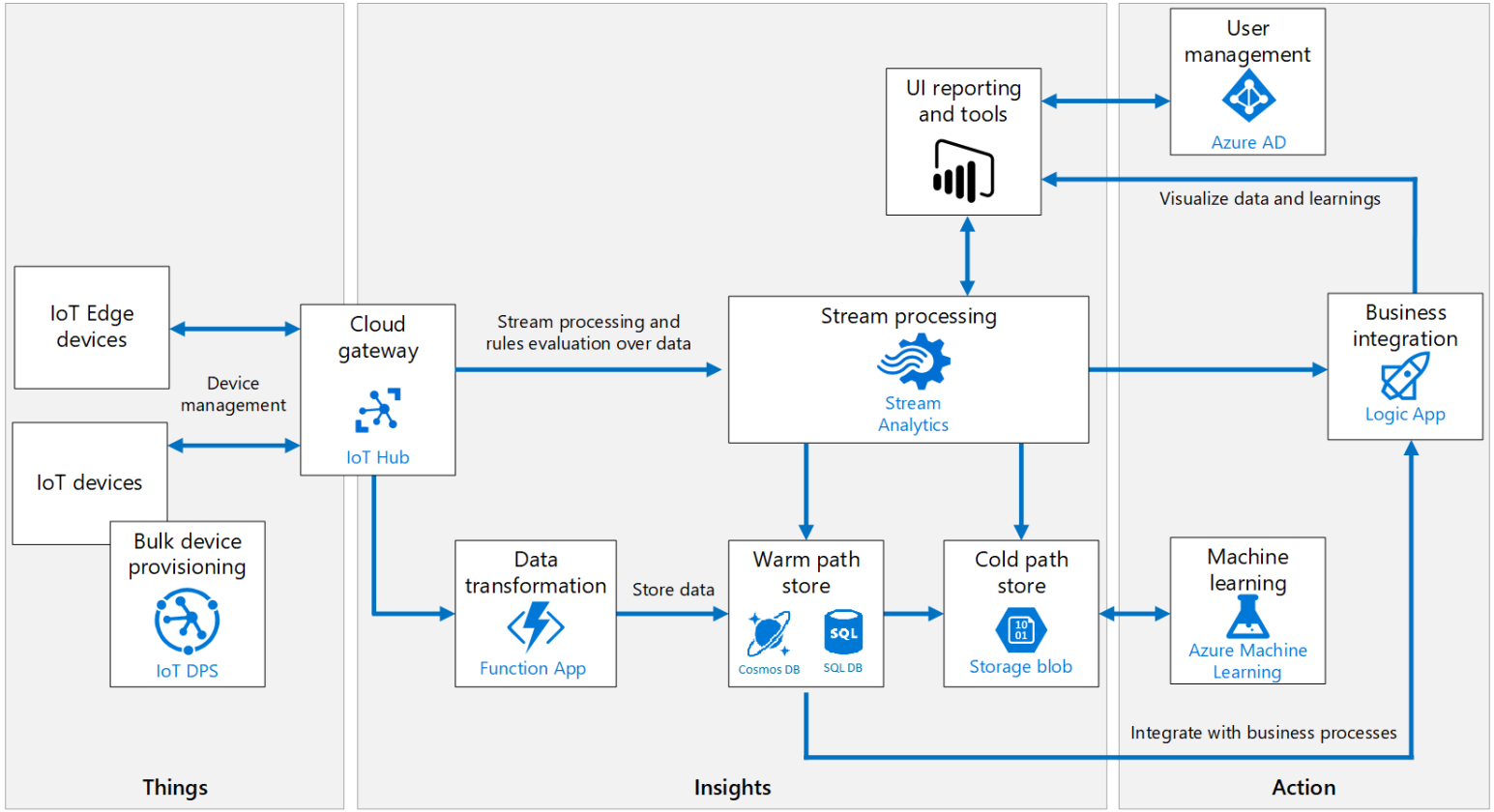
Authenticating Devices to the Cloud

- Symmetric Keys (Azure only)
- Provisioning Unique X.509 Certificates
- TPM Attestation
- Other mechanisms
  - Device claiming (Azure Sphere)
  - CSRs with device keys
  - Preregistering device ids and public keys
  - JSON Web Tokens (Google)

AWS Architecture: Device Fleet Analytics

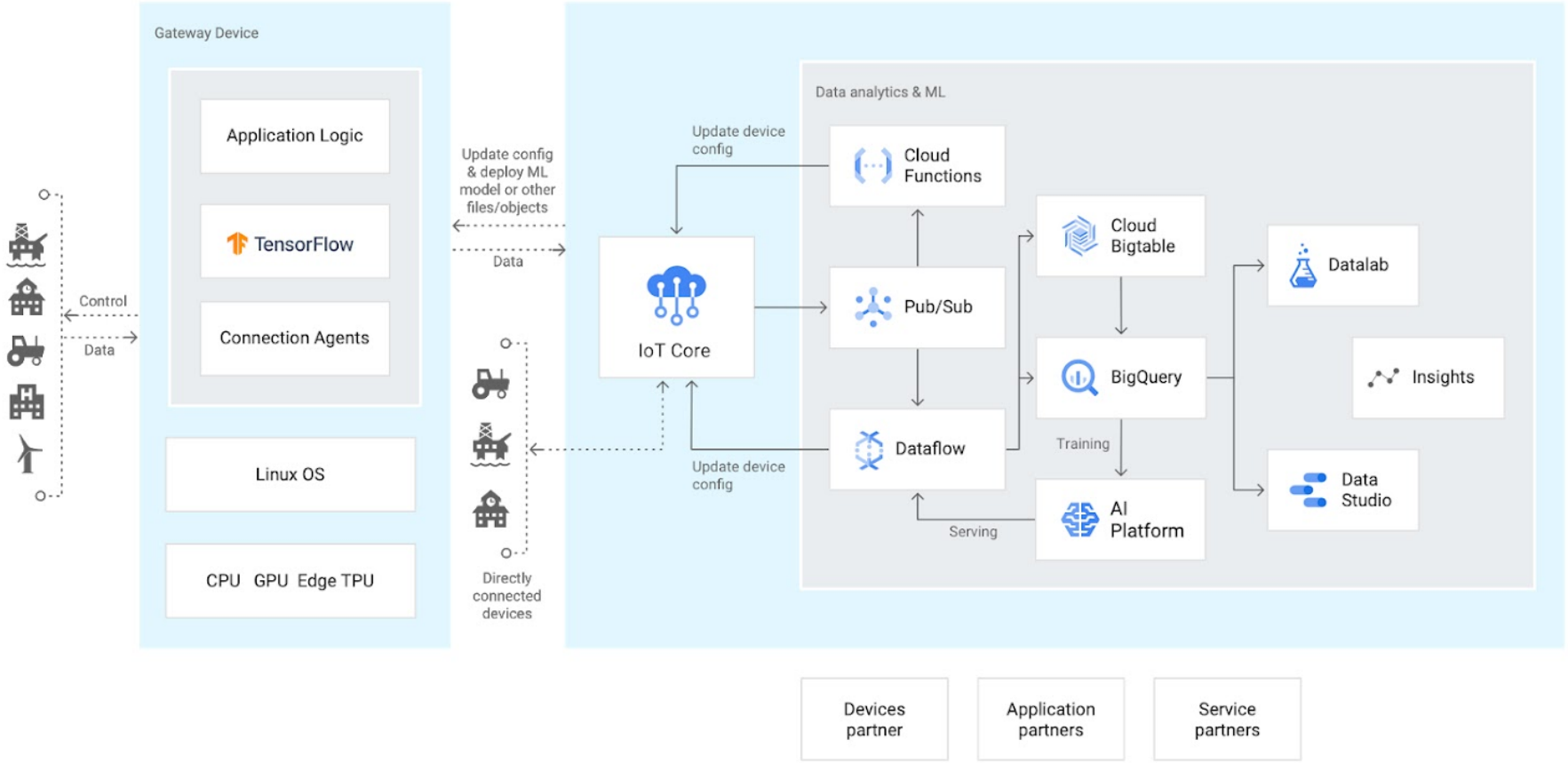


Comparable Azure Architecture



https://docs.microsoft.com/en-us/azure/architecture/reference-architectures/_images/iot.png

Bonus: Comparable GCP Architecture



https://cloud.google.com/iot-core

5.

Cloud Cost Optimization

General Cloud Cost Optimization

Right sizing

- Appropriate instance sizes
- Appropriate capacity units

Purchasing Options

- Spot instances
- Reserved instances
- Reserved capacity

Utilization

- Managed services
- Auto scaling
- Load balancing

Buffering

- Stream data processing
- Buffer data in queues

Specific Optimization Examples

IoT Hub Tiers (Azure)

- Basic Tier Units $10-$500/mo
- Standard Tier S1 Units $25-$2500/mo
- 60-80% cost reduction

IoT Core Pricing (AWS)

- Pay per request
- Pay per utilization of specific features
- Optimize applications to reduce utilization

S3 Storage Classes (AWS)

- Standard storage - $0.023/GB
- Glacier Deep Archive - $0.00099/GB
- Creating appropriate lifecycle policies

Blob Storage Access Tiers (Azure)

- Premium, Hot, Cool, Archive
- Creating appropriate lifecycle policies

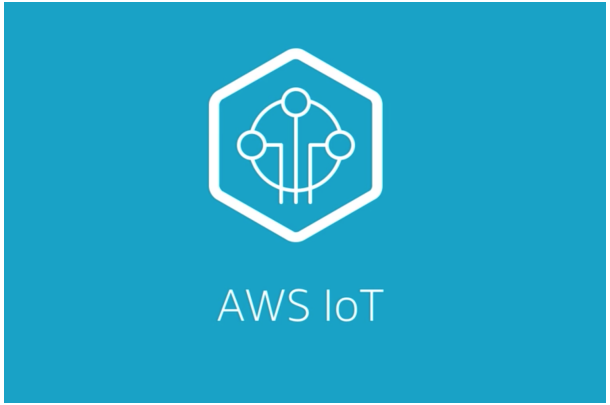
Azure and AWS IoT Cost Optimization

Azure IoT Hub

- Select the tier you need (basic vs. standard)
  - Do you need bidirectional communication or not?
- Tune the number and type of IoT Hub units
- Setup auto-scaling for IoT Hub
- Tune device applications to reduce usage

AWS IoT Core

- Pay per request and feature pricing
- Reduce usage to only required features
- Reduce connectivity, messages, bundle data
- Optimize message sizes for metering
  - 8 KB message, 5 KB metering, charged at 10 KB



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Questions?

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