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Service Bus HA

Availability & recovery concepts for Integration architects

Daniel Larsen

Senior Customer Engineer – FastTrack for Azure

September 2020

Azure messaging services

Service Bus



Reliable
messaging

High-speed buss
Message broker
Server-side cursor

Event Hubs



High throughput
ingestion

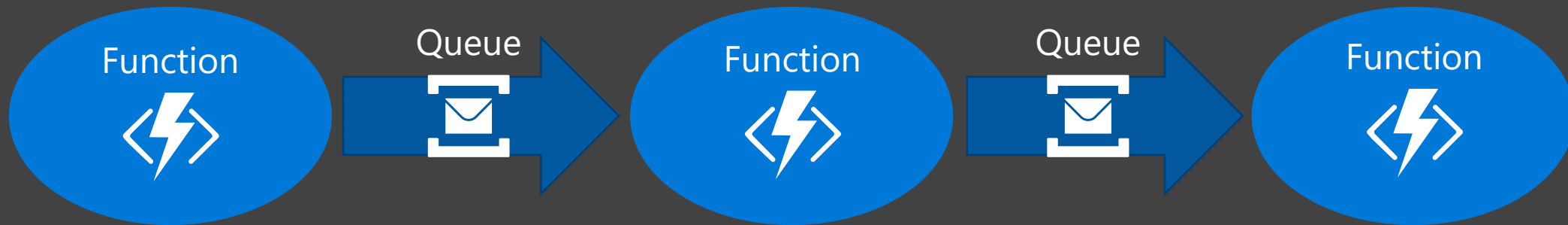
IoT Hubs
Client-side cursor

Event Grid

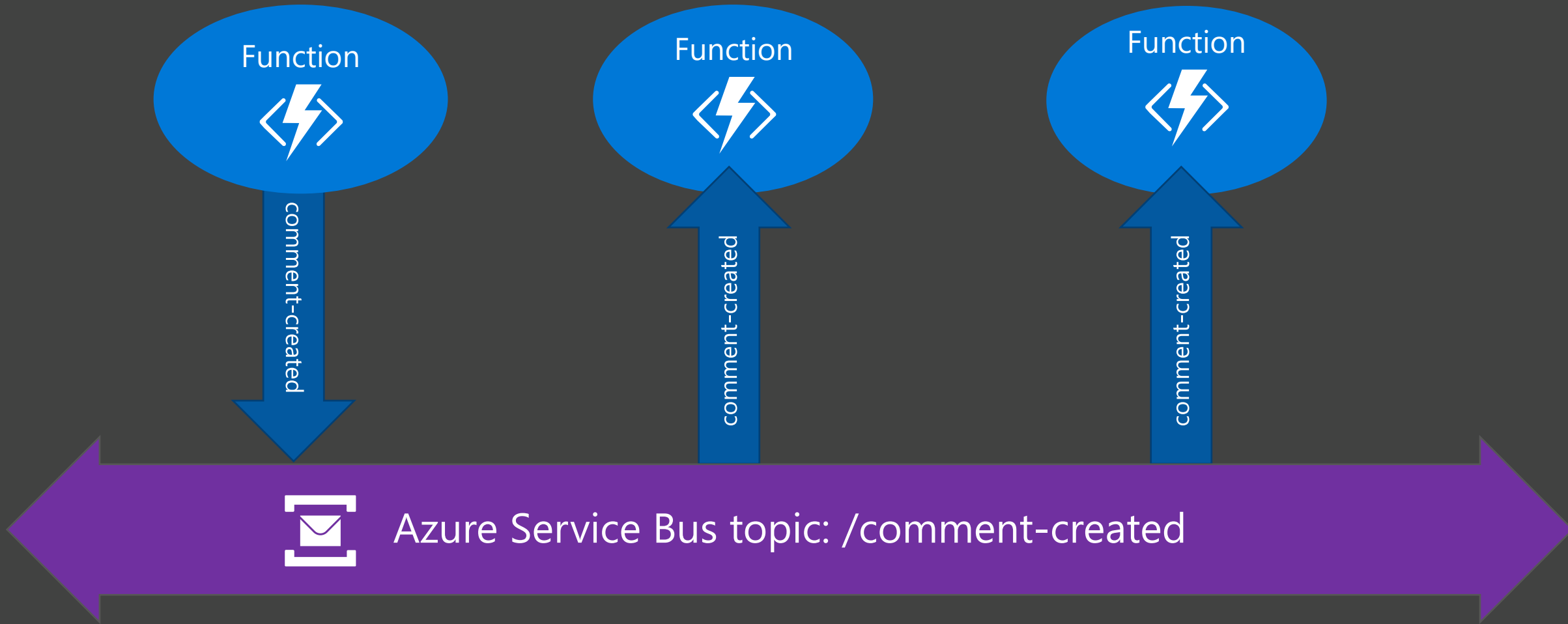


Cloud scale
eventing

Pipes & Filters

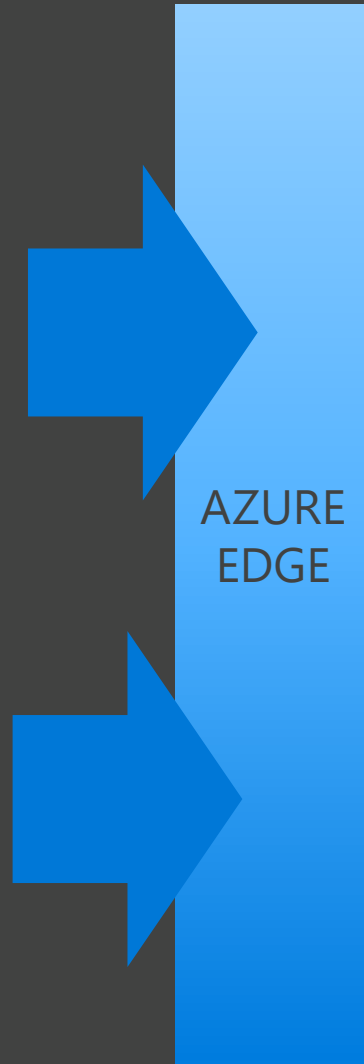
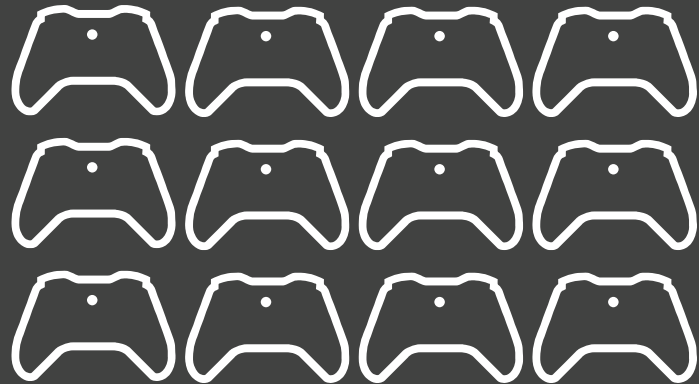
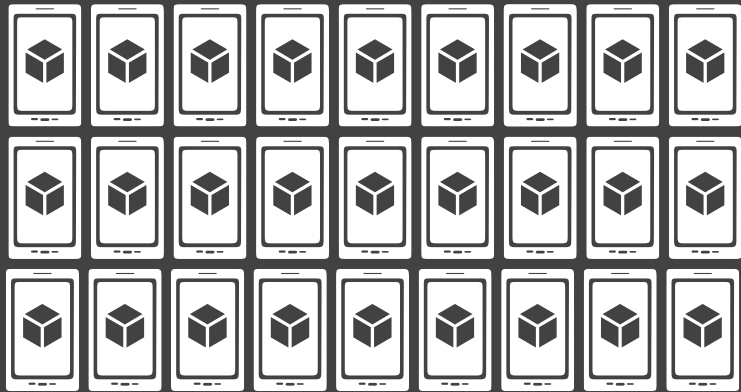


Publisher / subscriber (pub/sub)



Event streaming

10's of millions
of devices



Event Hubs



Stream
Analytics



Cosmos DB



Power BI



IoT Hubs



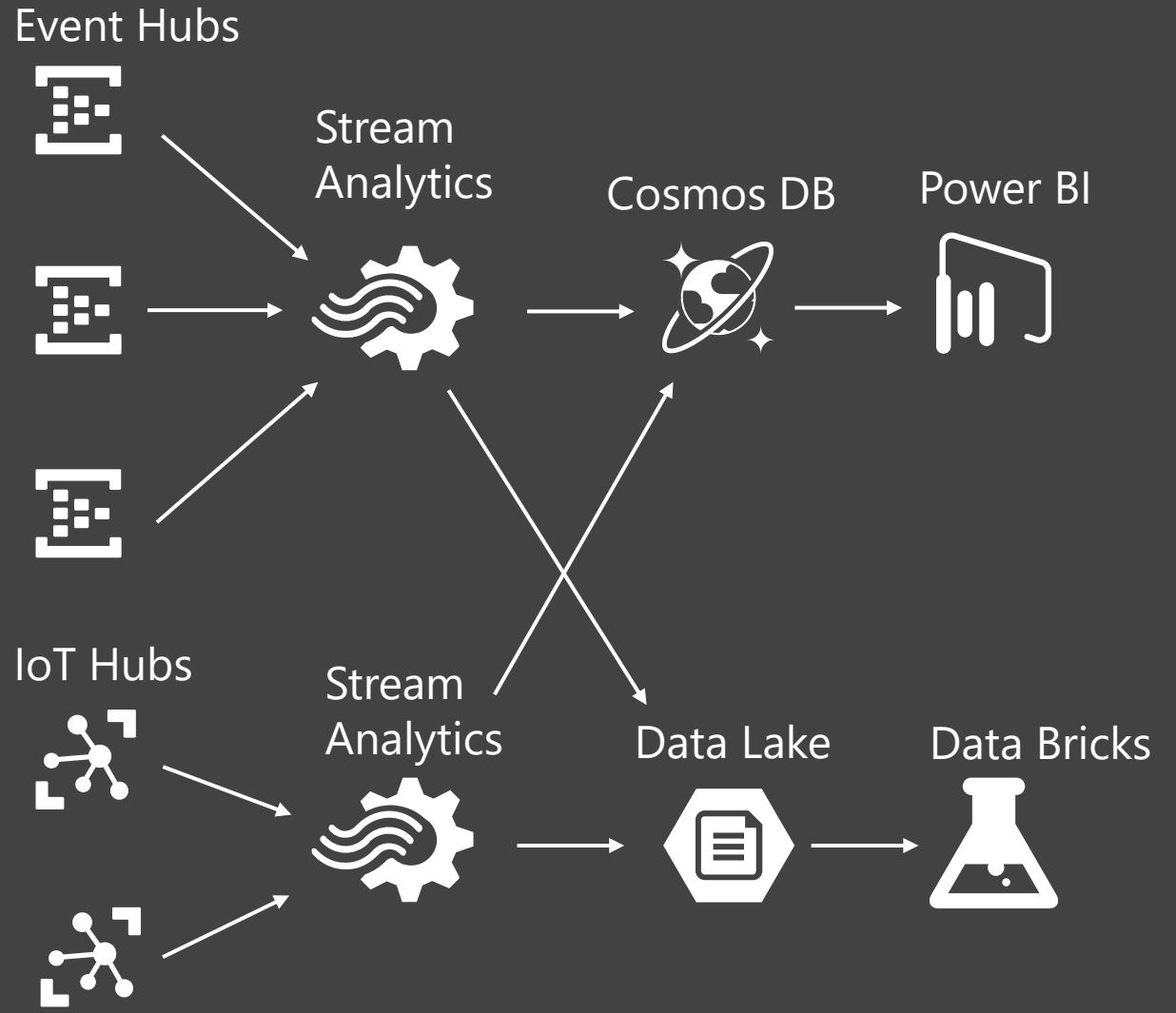
Stream
Analytics



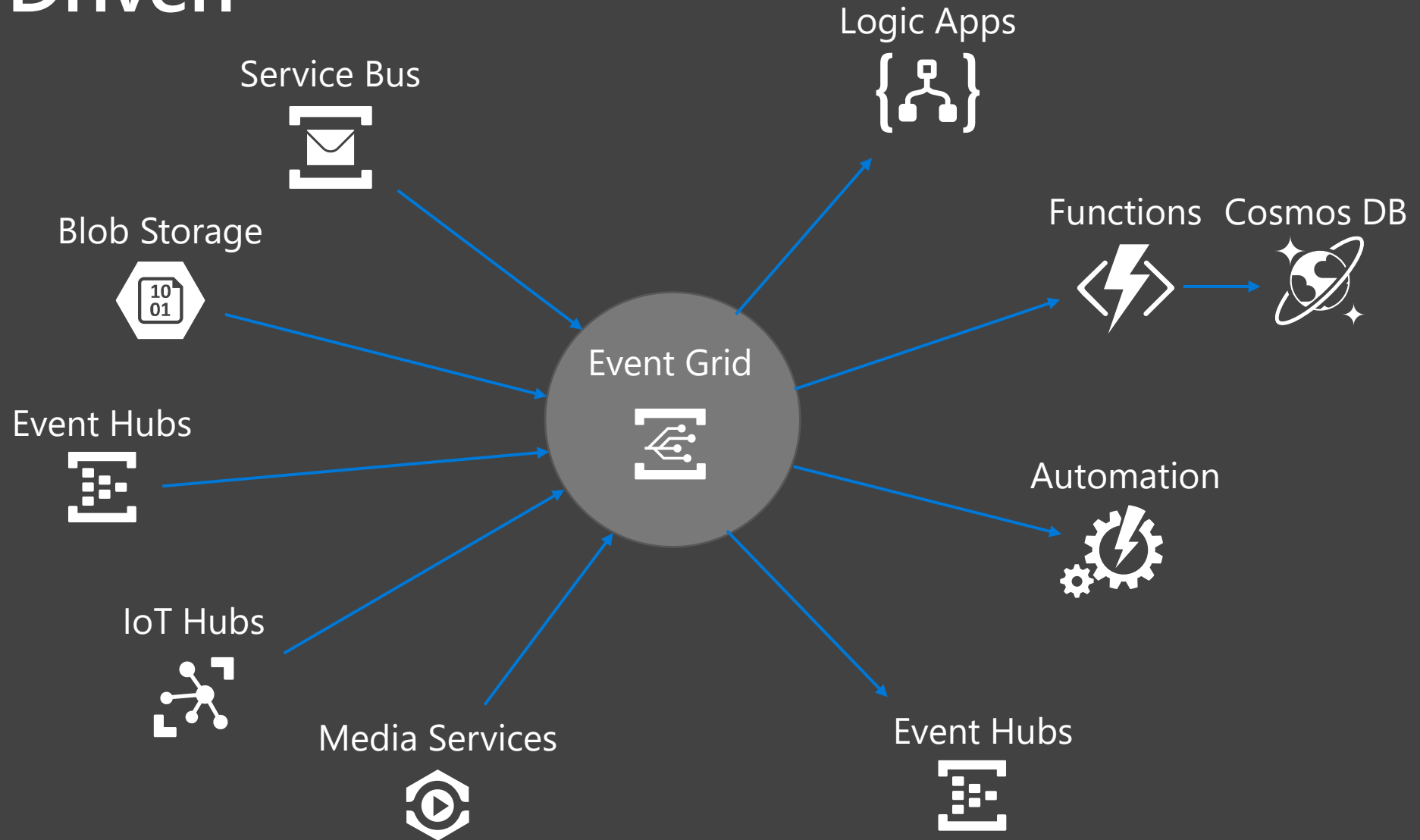
Data Lake



Data Bricks



Event Driven



Availability

The ability of a system to be available to respond to requests

Measured by:

Uptime as a percentage per month

3 nines (99.9%) / 3.5 nines (99.95%) / 4 nines (99.99%)

Recovery

How quickly a system can recover from failure

How much data would be lost in the event of a failure

Measured by:

RTO: Recovery time objective

RPO: Recovery point objective

Seconds / Minutes / Hours / Days

Highly available

Service Bus



99.9%

Plan for 44 mins
downtime per month

Event Hubs



99.95%

Plan for 22 mins
downtime per month

Event Grid

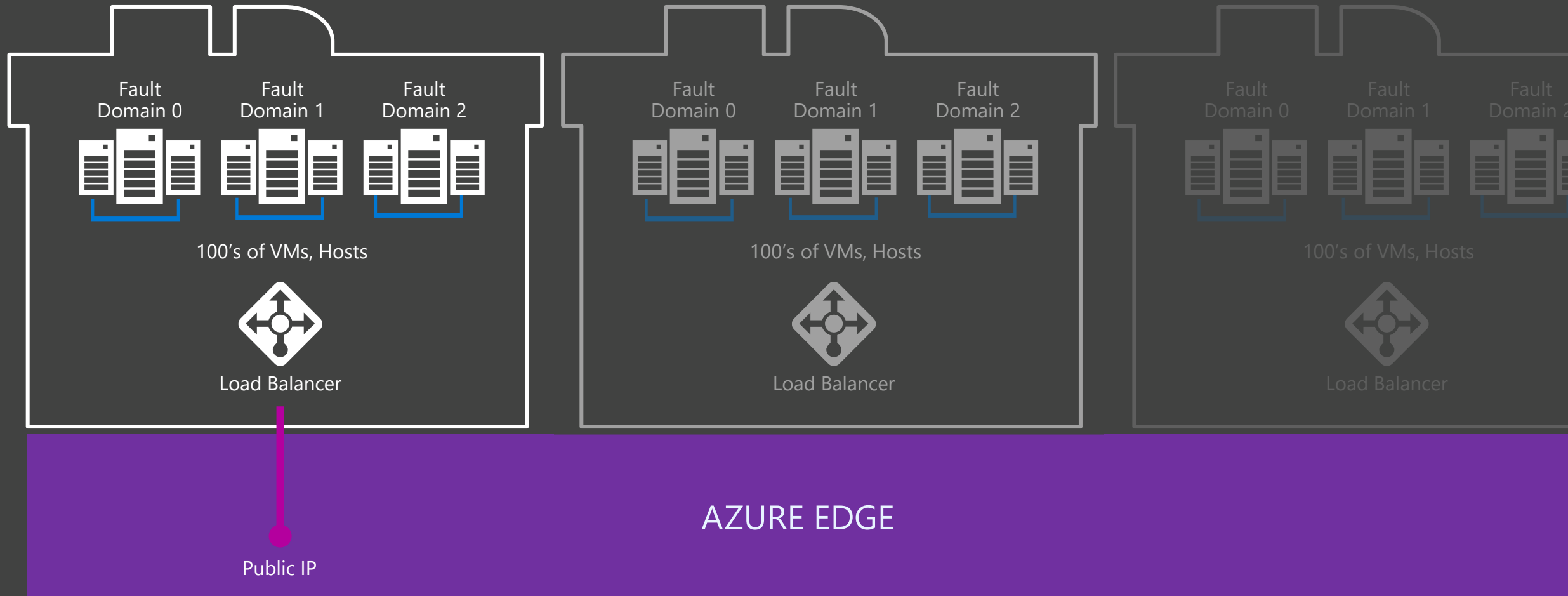


99.99%

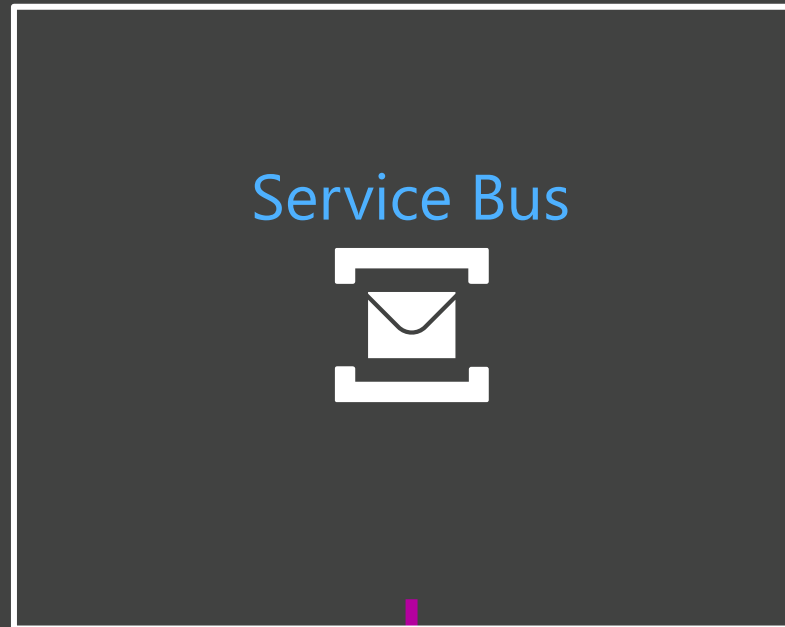
Plan for 4 mins
downtime per month

Single region

Azure Service Bus Infrastructure



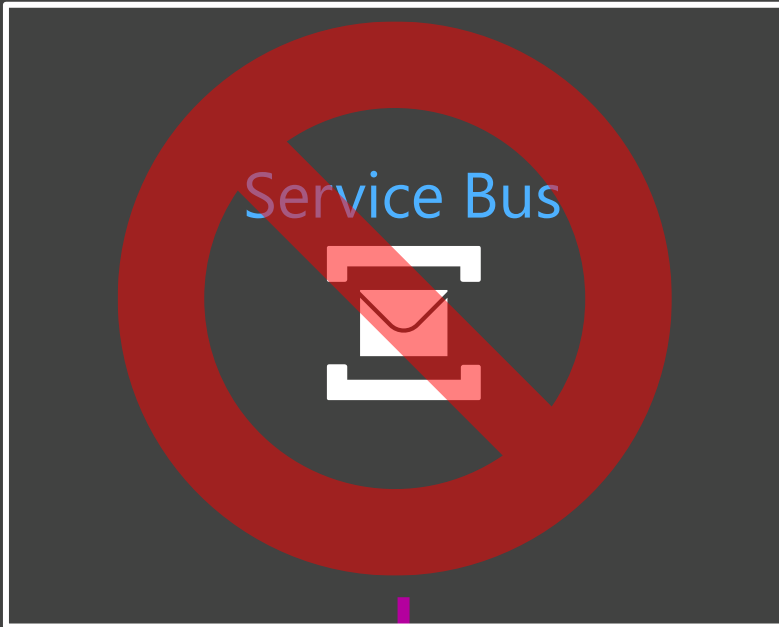
Service failure



Public IP

AZURE EDGE

Service failure



Transient failure < 1 minute

Retry for up to a minute

https://azure.microsoft.com/en-au/support/legal/sla/service-bus/v1_1/

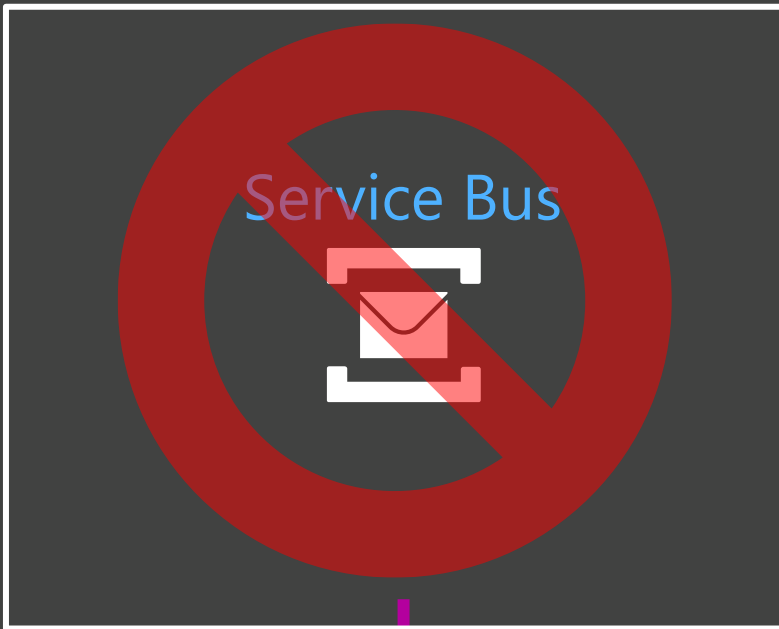
<https://docs.microsoft.com/en-us/azure/architecture/patterns/retry>

<https://docs.microsoft.com/en-us/azure/architecture/best-practices/retry-service-specific#service-bus>

AZURE EDGE

Public IP

Service failure



Transient failure < 1 minute

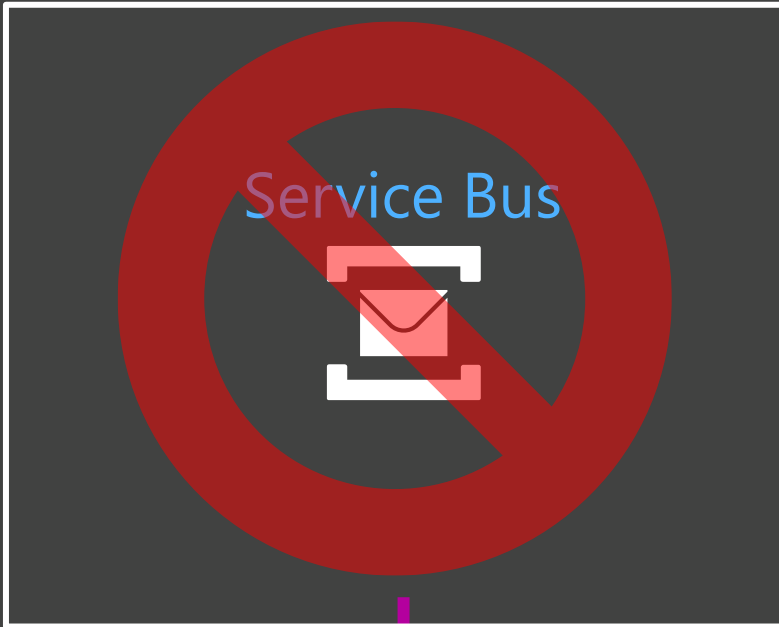
Persistent failure > 1 minute

Option 1: Wait

AZURE EDGE

Public IP

Service failure



Transient failure < 1 minute
Persistent failure > 1 minute

Option 1: Wait

Option 2: Run book

AZURE EDGE

Public IP

Runbook: Service Bus persistent failure

Failure mode: Service Bus has is not responding to repeated retries after 1 minute

1. Wake up Bob
2. Try redeploy Service Bus, new namespace, same region:

```
PS> ./deploy-sb -Name 'mysaasapp2-aue-bus' -Region 'Australia East'
```

If success, change connection string in Azure Configuration Service

```
PS> ./failover-sb -NewPrimary 'mysaasapp2-aue-bus' -Region 'Australia East'
```

If not success, Try redeploy Service Bus, new namespace, secondary Region

```
PS> ./deploy-sb -Name 'mysaasapp2-ase-bus' -Region 'Australia Southeast'
```

Change connection string in Azure Configuration Service

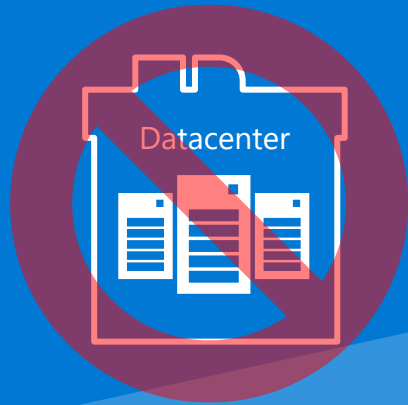
```
PS> ./failover-sb -NewPrimary 'mysaasapp2-ase-bus' -Region 'Australia Southeast'
```

3. Monitor until primary recovers and then run failback Runbook

(etc...)

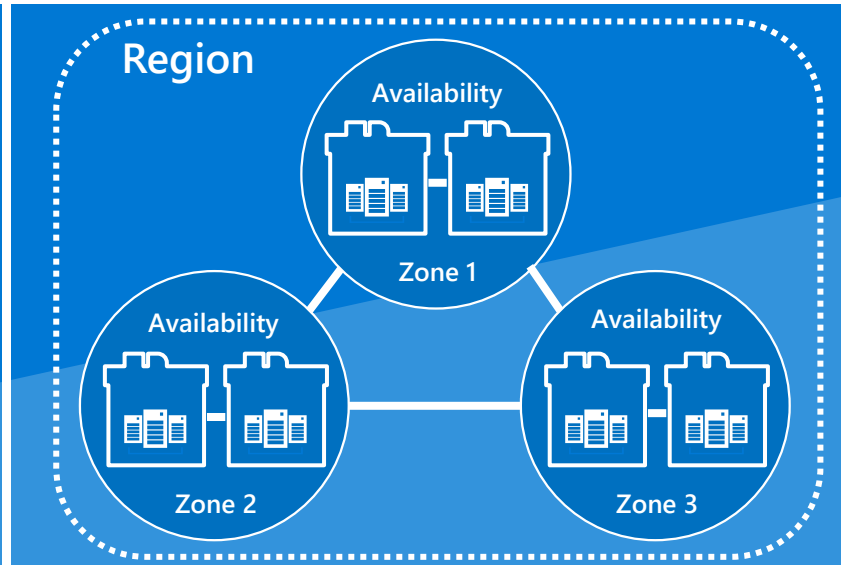
Azure protection options for all scenarios

Introducing Availability Zones, protecting from datacenter level failures



Availability Sets

High Availability protection from hardware failures in a datacenter.



Availability Zones

High Availability protection against loss of datacenters. Multiple datacenters per physically separated zone. Each zone features independent network, cooling, and power.

Make this namespace zone redundant

Create namespace
Service Bus

* Name
JustSBAZ ✓
.servicebus.windows.net

* Pricing tier
Premium >

Messaging Units ⓘ
1 ▾

* Subscription
Justin ▾

* Resource group ⓘ
☐ Create new ☒ Use existing
FrancoResources ▾

* Location
Central US

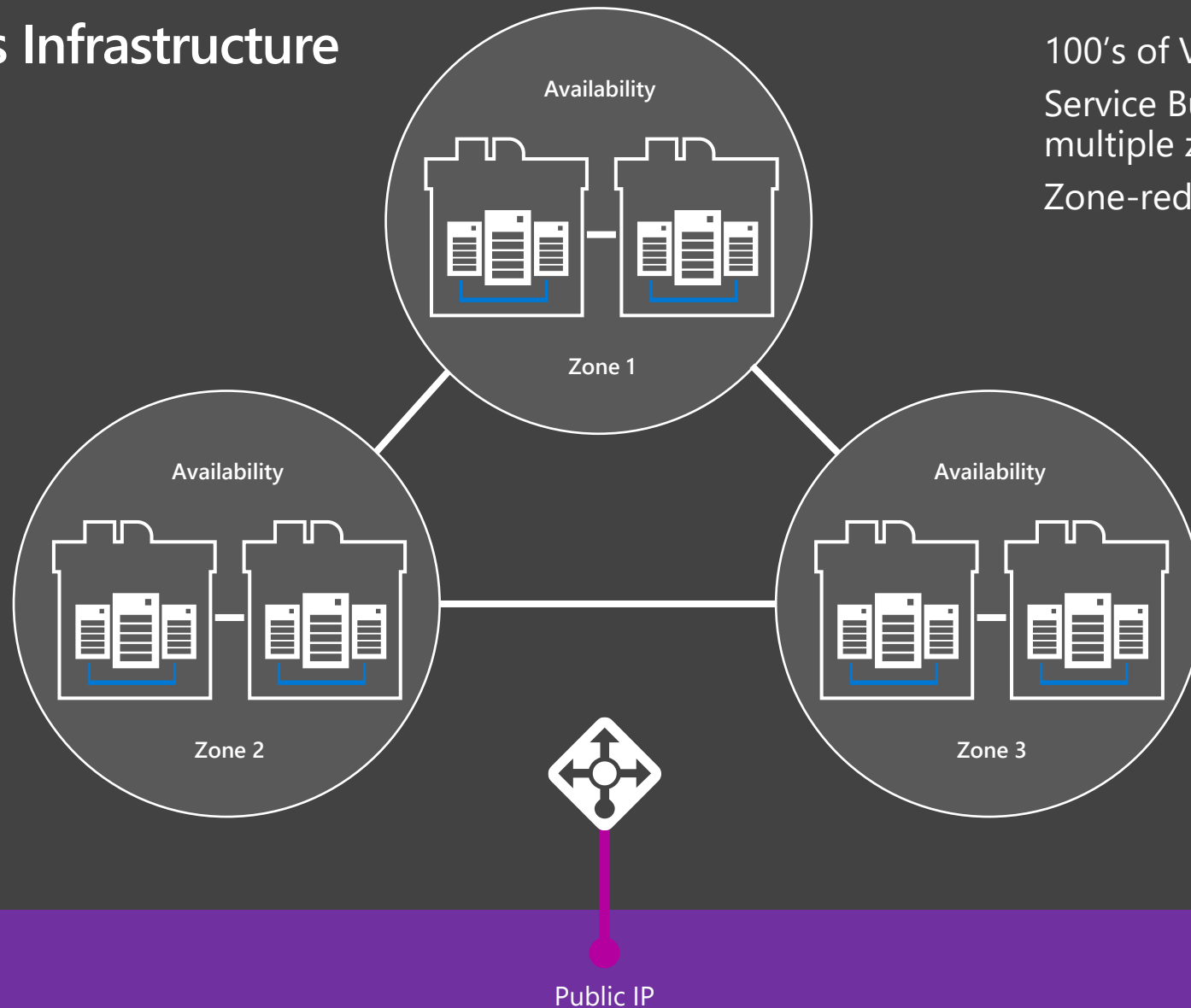
☒ Make this namespace zone redundant ⓘ

Provides enhanced availability by spreading replicas across availability zones within one region at no additional cost. [Learn more](#)

Create Automation options

Zone-redundant

Azure Service Bus Infrastructure



100's of VMs, Hosts

Service Bus service striped across multiple zones

Zone-redundant Load Balancers



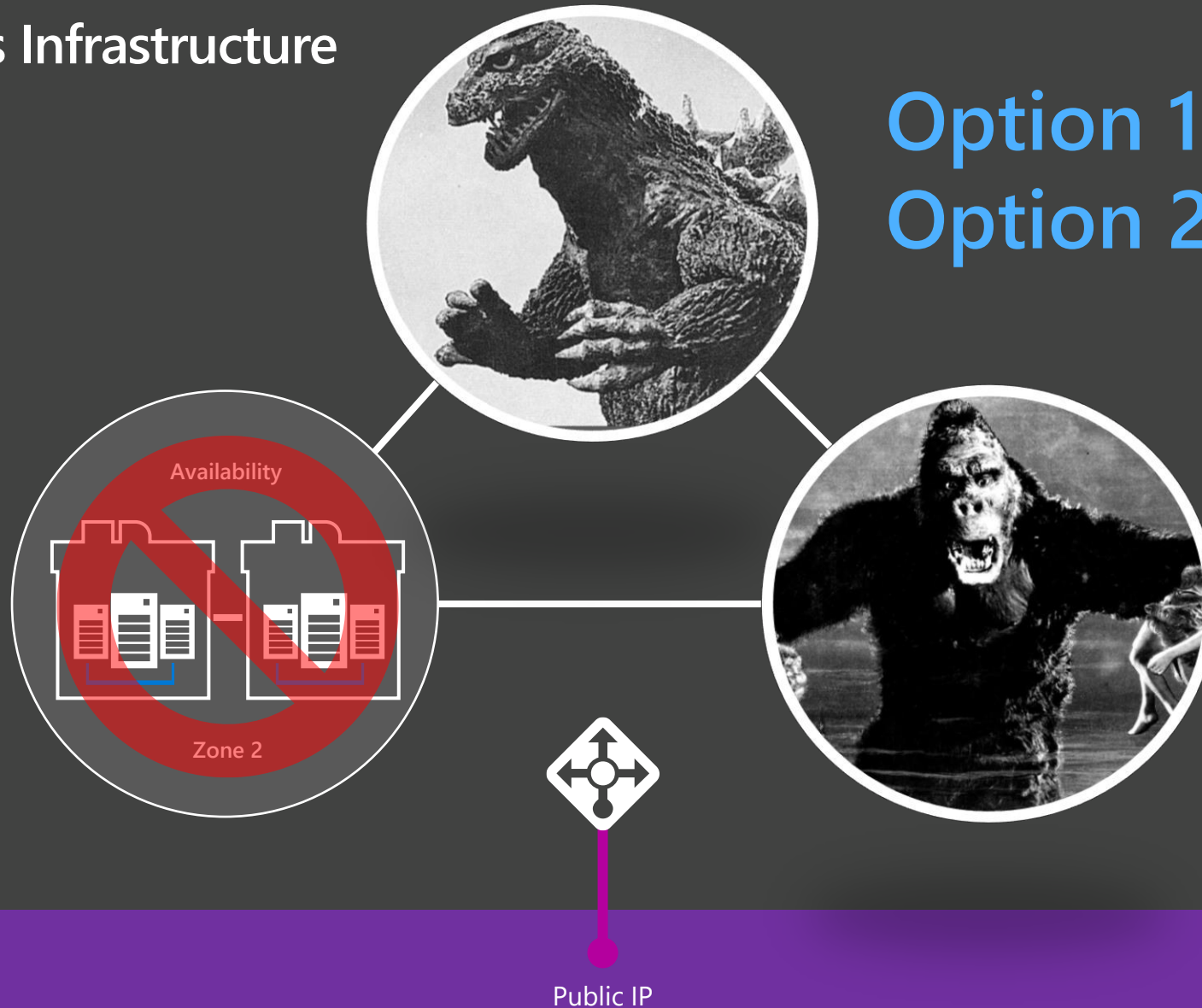






Zone-redundant

Azure Service Bus Infrastructure

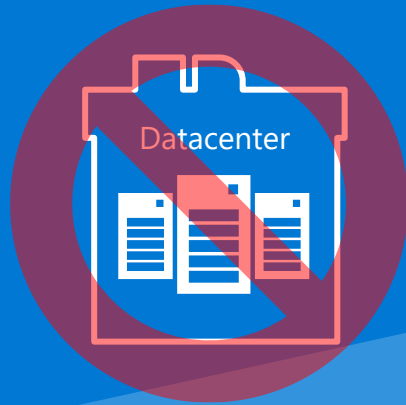


Option 1: Wait
Option 2: Runbook

Azure protection options for all scenarios

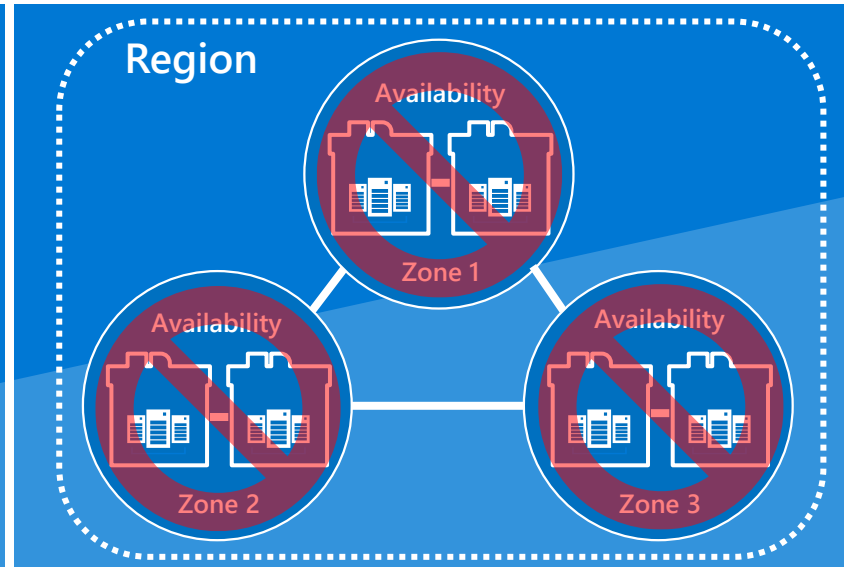
Introducing Availability Zones, protecting from datacenter level failures

Blast radius



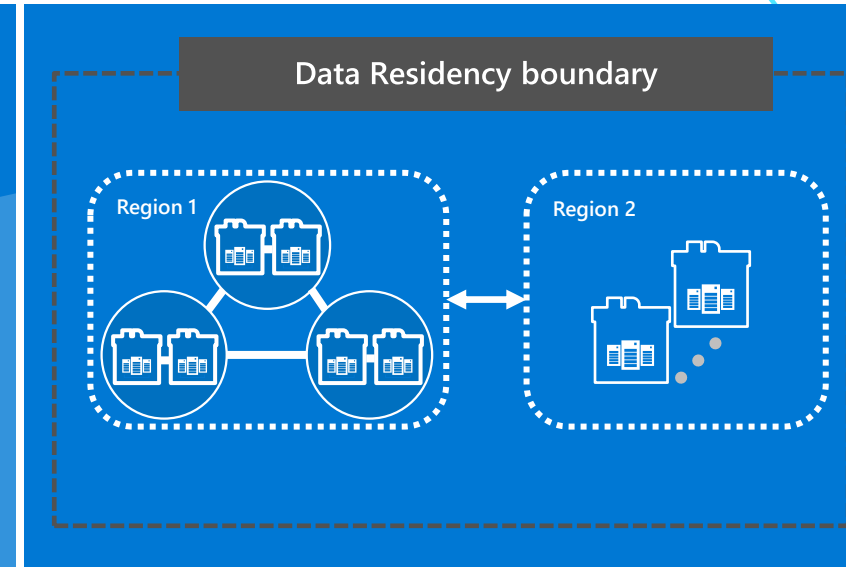
Availability Sets

High Availability protection from hardware failures in a datacenter.



Availability Zones

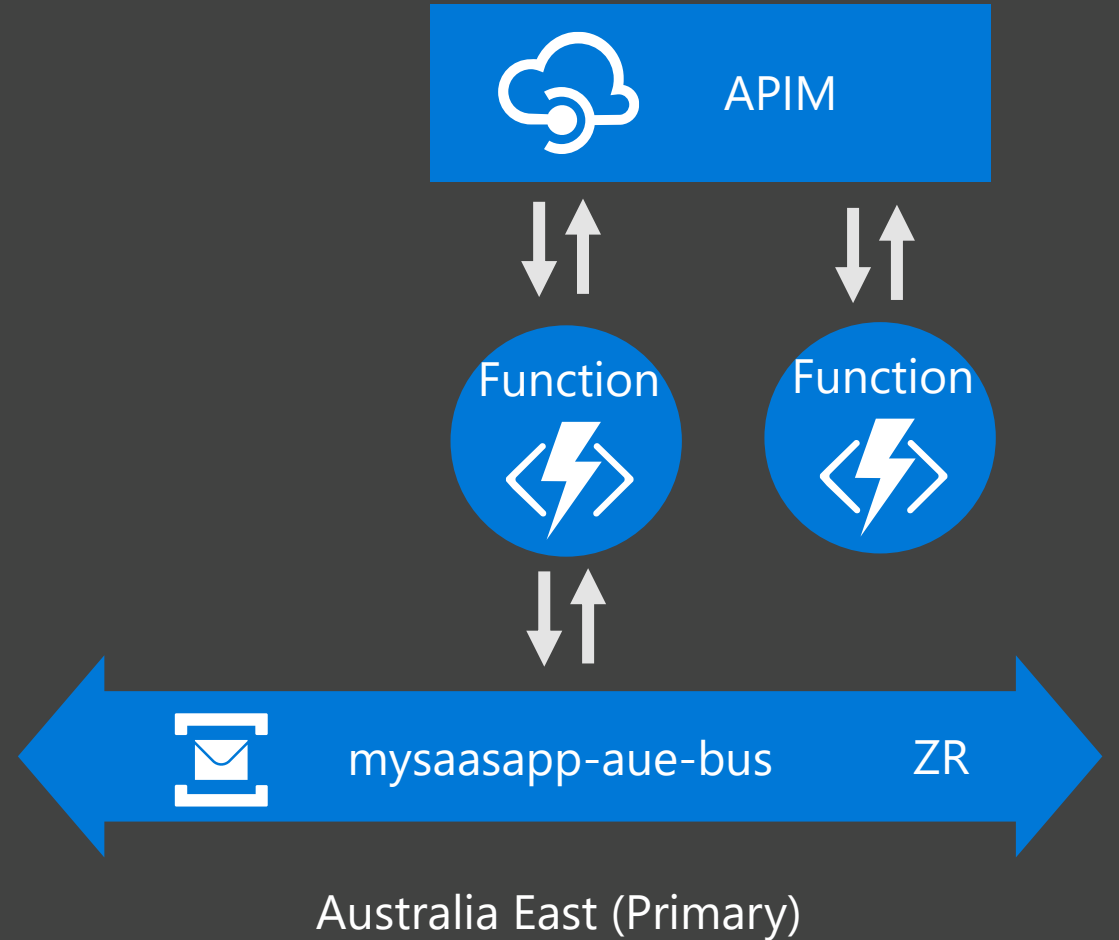
High Availability protection against loss of datacenters. Multiple datacenters per physically separated zone. Each zone features independent network, cooling, and power.



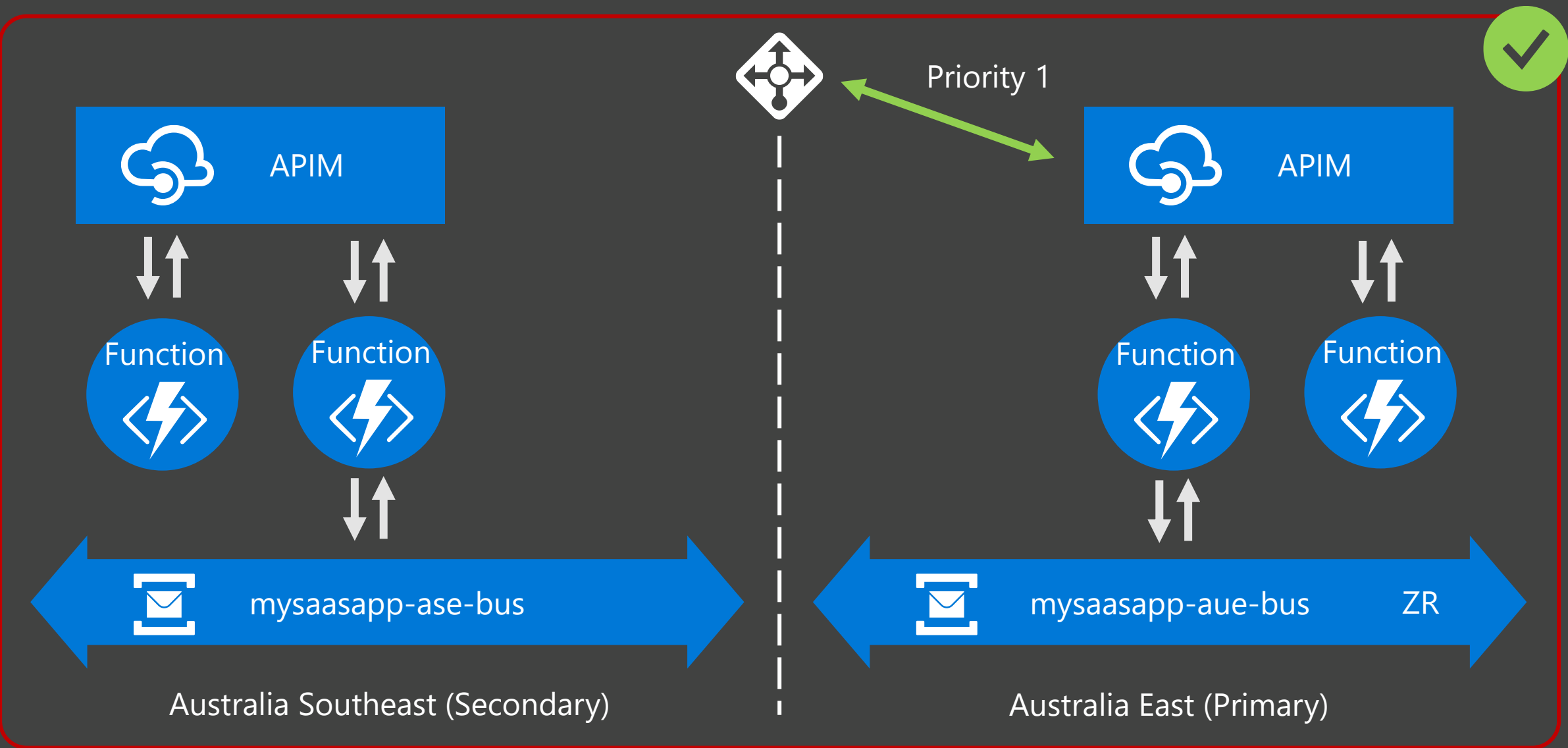
Region Pairs

Protection for your data and applications from the loss of an entire region with Geo-redundant storage (GRS) and Azure Site Recovery.

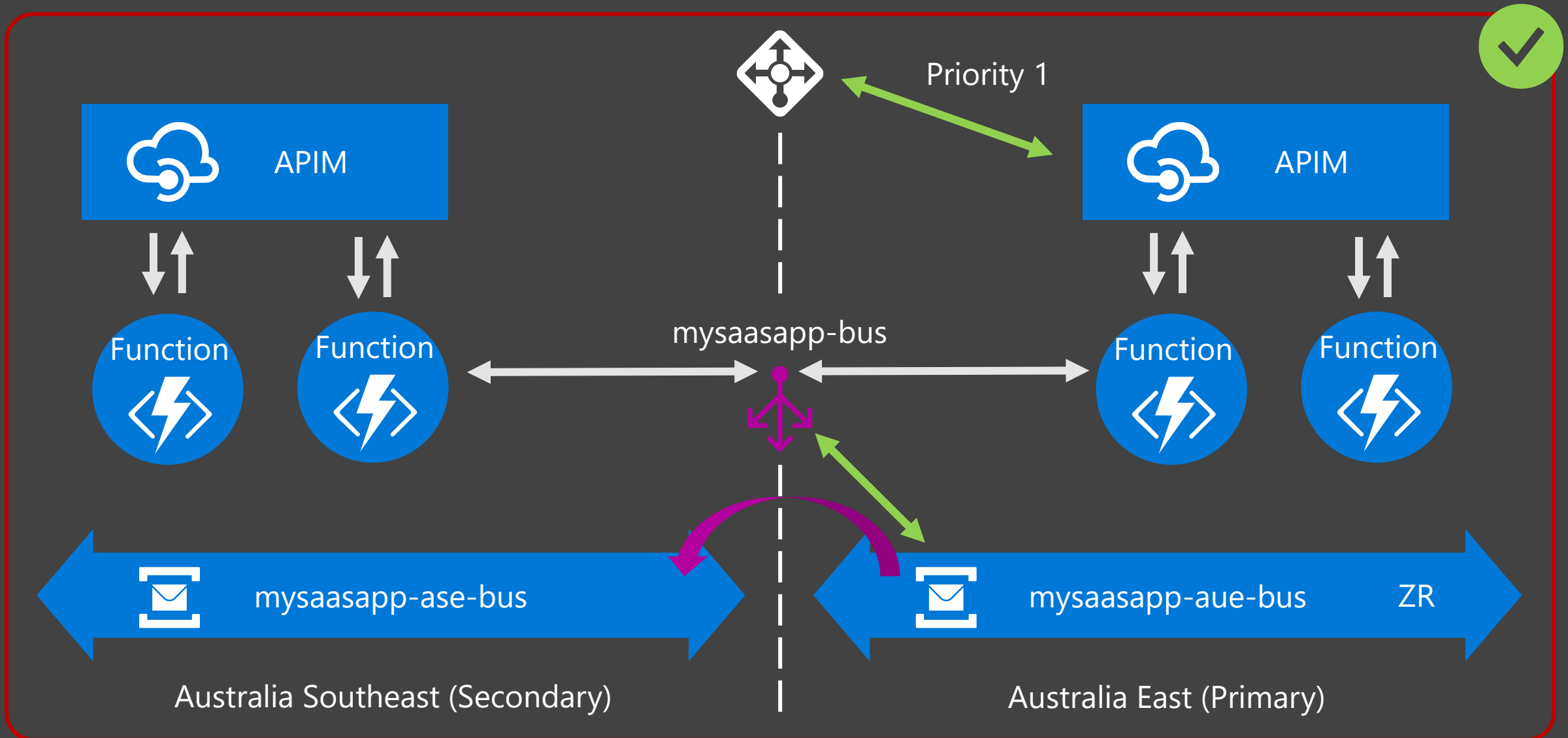
Multi-region architecture



Multi-region architecture

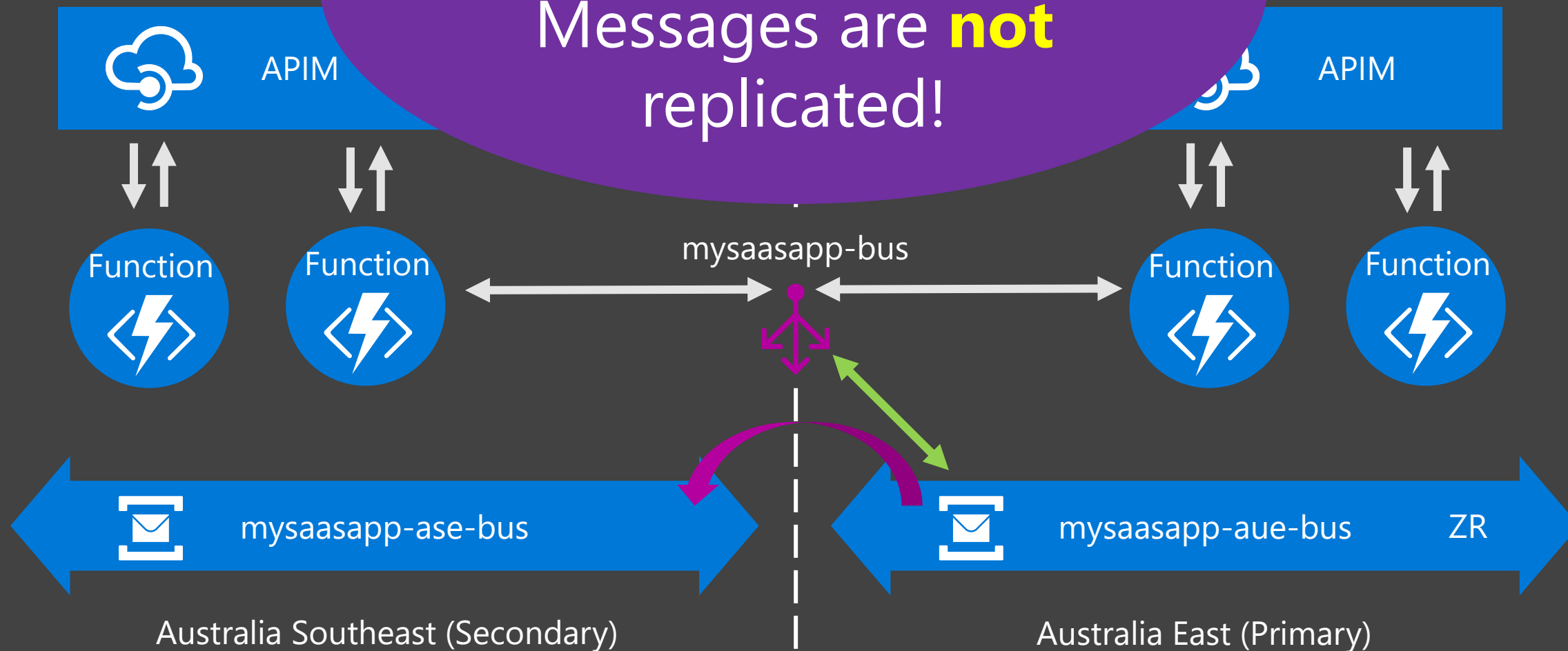


What about Geo-DR?

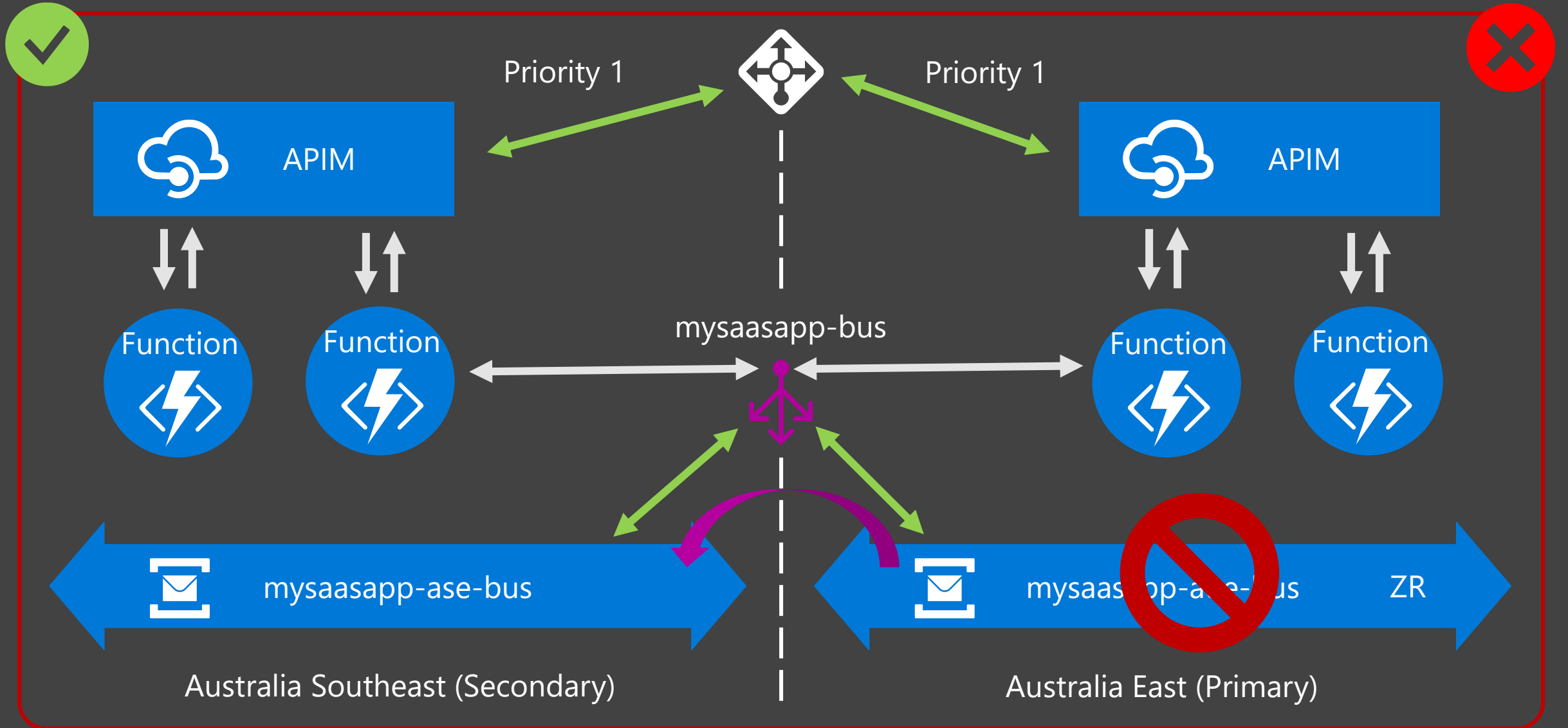


What about Geo-DR?

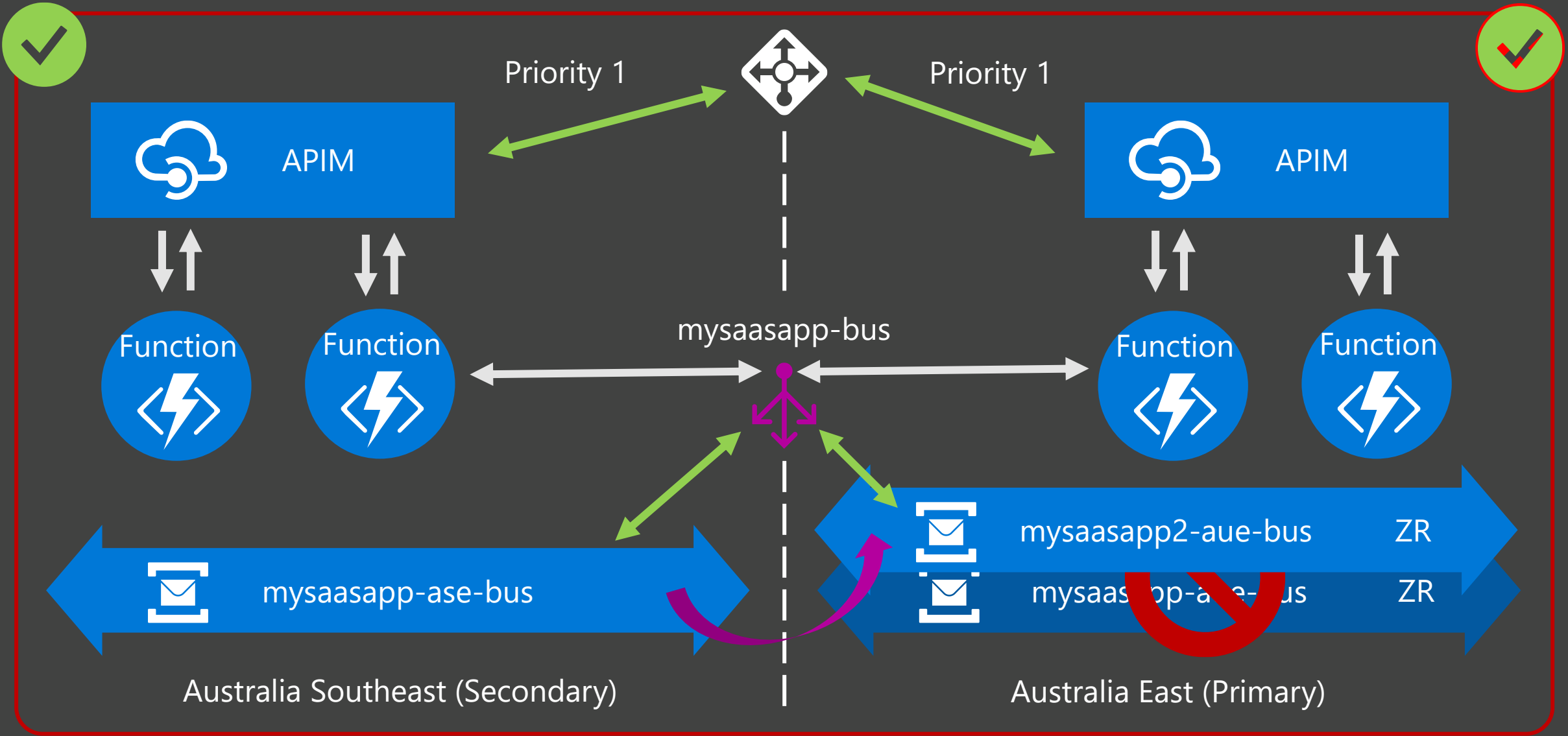
Service Bus
Geo-DR:
Messages are **not**
replicated!



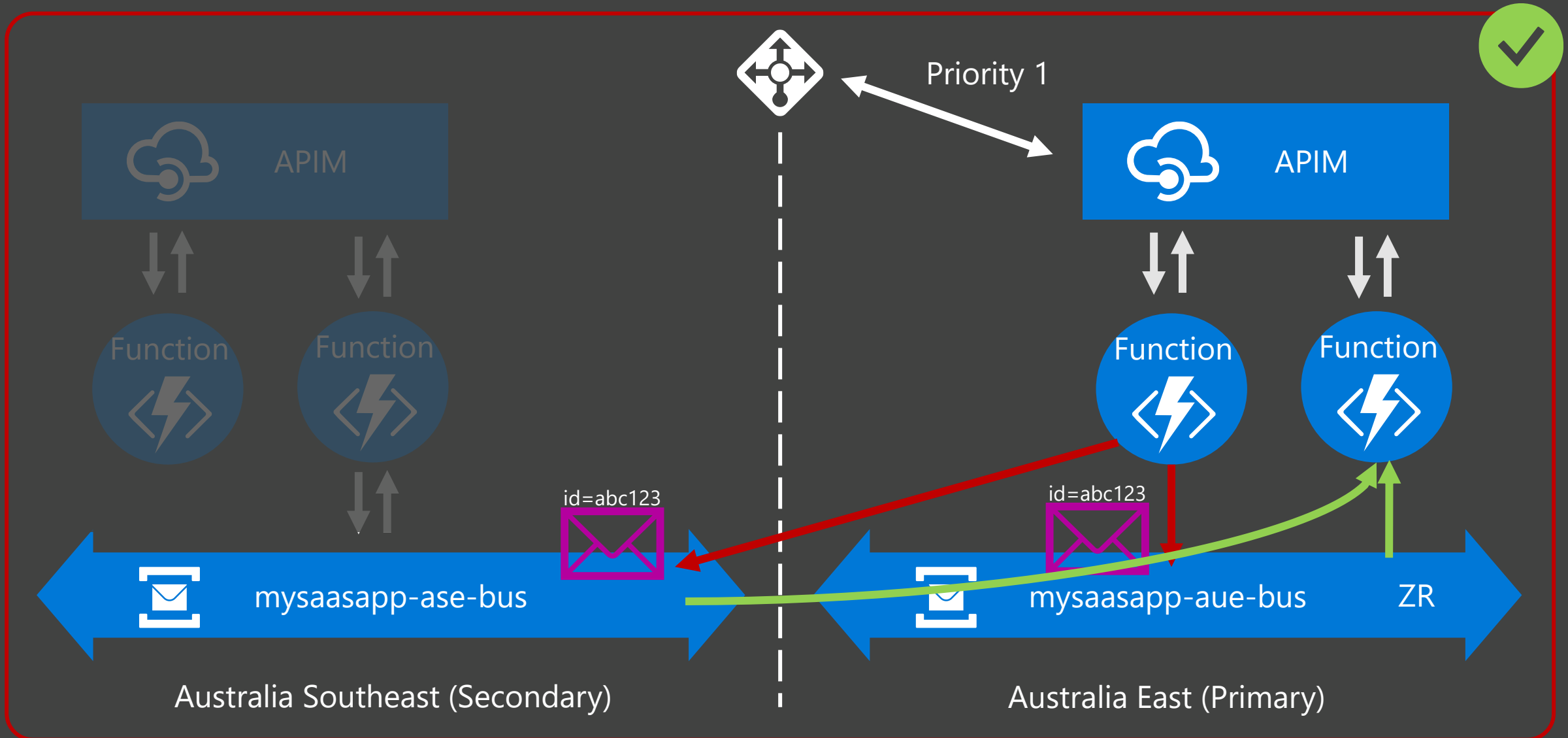
Abandon ship!



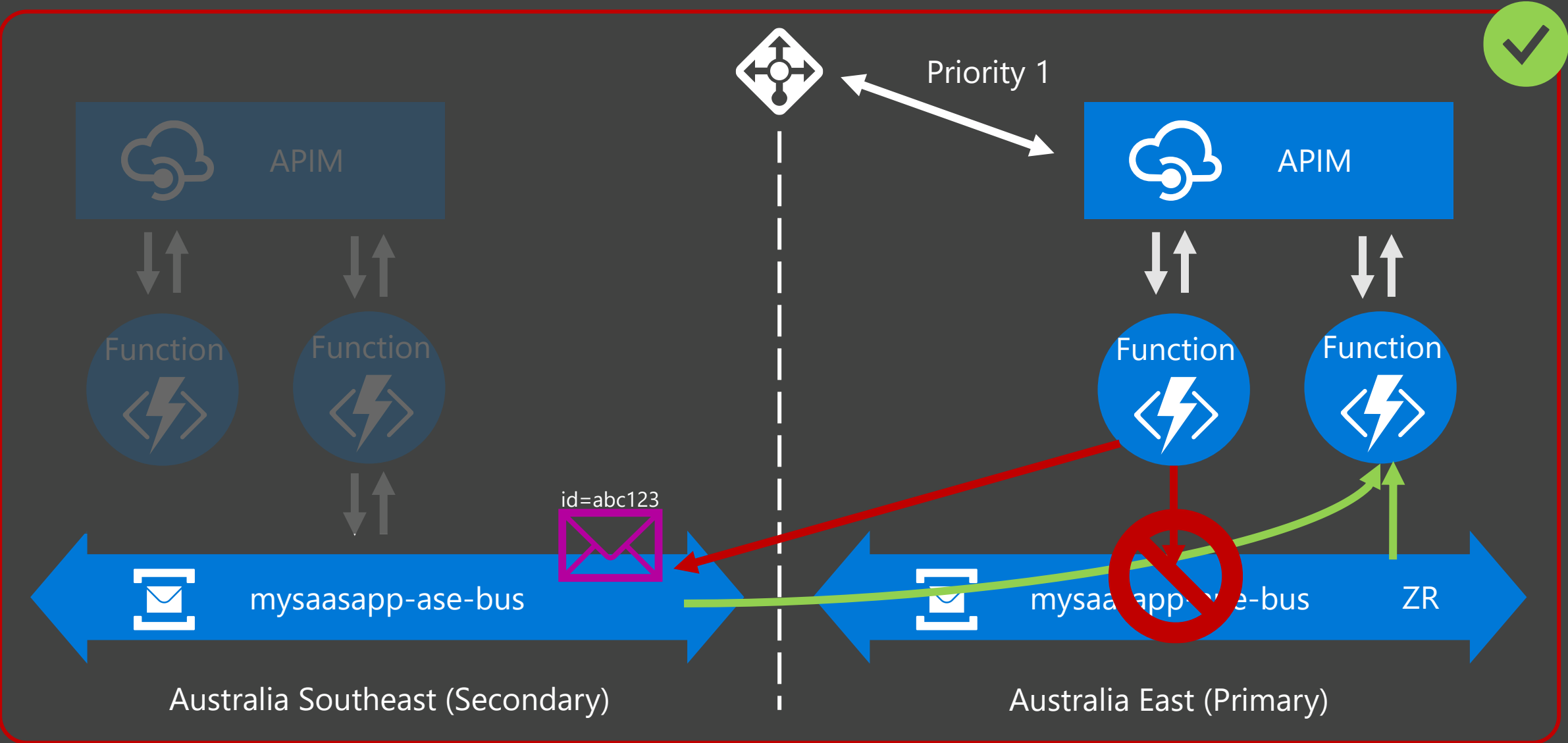
Fail forward



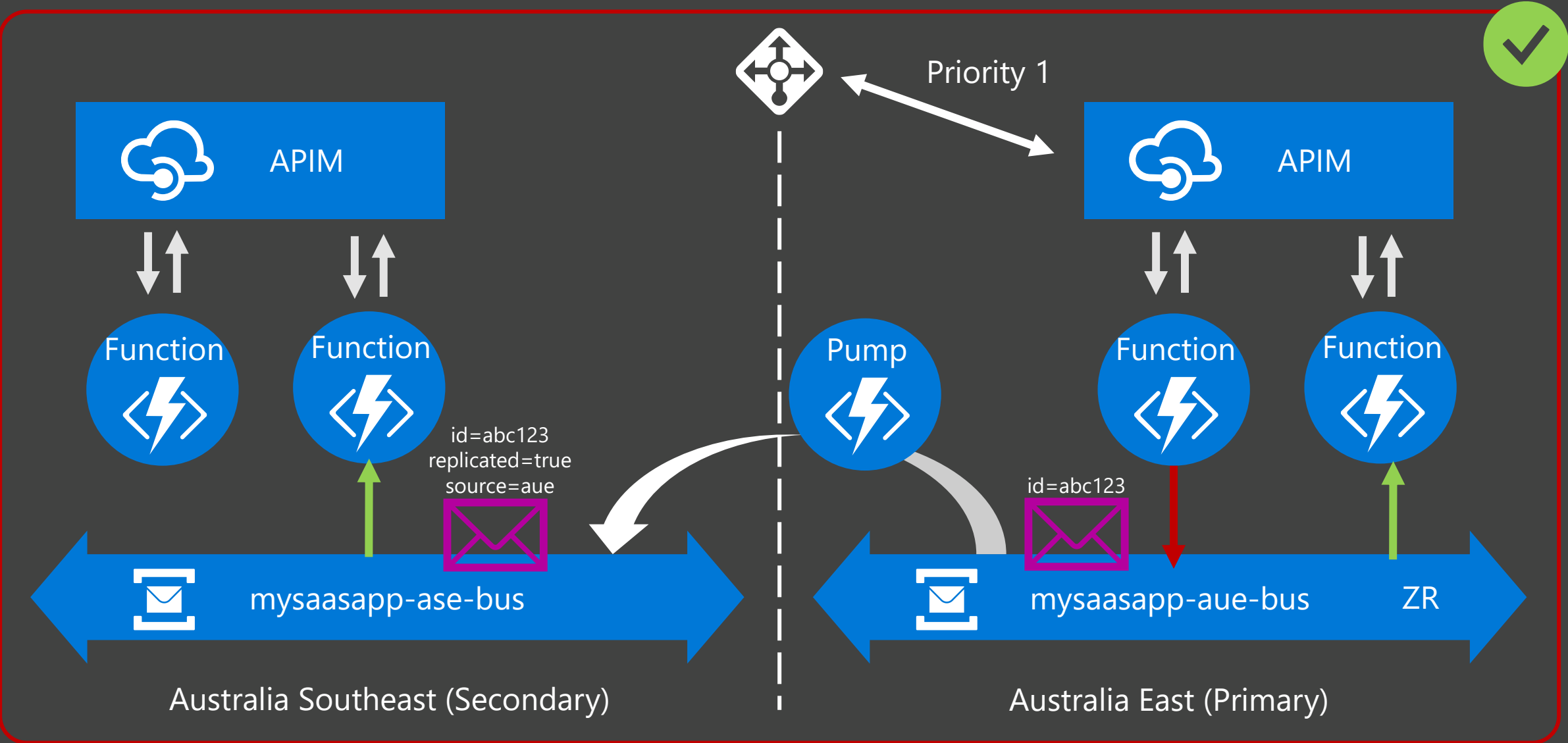
Active replication



Passive replication



Message Pump



Filters & Actions

Filters and Actions

```
{
  "properties": {
    "filterType": "CorrelationFilter",
    "correlationFilter": {
      "properties": {
        "replicated": null
      }
    },
    "action": {
      "sqlExpression": "SET replicated = true; SET source = 'aue';"
    }
  }
}
```

Before we go

Microsoft Azure Well Architected Framework, Reliability Pillar
Microsoft Learn

<https://docs.microsoft.com/en-us/azure/architecture/framework/resiliency/overview>
<https://docs.microsoft.com/en-us/assessments/?id=azure-architecture-review&mode=pre-assessment>
<https://docs.microsoft.com/en-us/learn/modules/azure-well-architected-reliability/>

Summary

Azure Messaging Services are PaaS services

They are already highly available with a financially backed SLA

Most failures in cloud are transient. Ensure your client is resilient

Retry pattern

Write runbooks. Practice Failure mode analysis

Enable Zone-redundant configuration

Understand Geo-DR

Multi-region architecture for advanced availability requirements





thank
you!

