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Microsoft *Zero To* Hero

The story of DATA SPRINT

DataSprint is facing a bottleneck in partnering due to outdated data exchange methods.

Each collaboration requires a time-consuming, partner-specific onboarding process, wasting resources on a procedure that should be a no-brainer.

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The goal is to surface datasets to their customers in a secure, performant and scalable way

- The projections are ready for external use in form of SQL views

- Read-only access to the datasets

- Need for an interoperable format with a large ecosystem of clients

- The data access must be secured

- Avoid development cost for every new projection to be exposed

- Avoid steep learning curve

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Approach : Azure PaaS

Innovate Faster

Innovate faster and compete better.
Leverage pre-built services and components to reduce the development time.

Optimize Cost

Do more with less by leveraging efficient resource utilization and auto-scaling.

Operate with confidence

Give to developers the tool for a better security, resiliency and performances.

Innovate faster

Innovate faster : welcome Data API builder

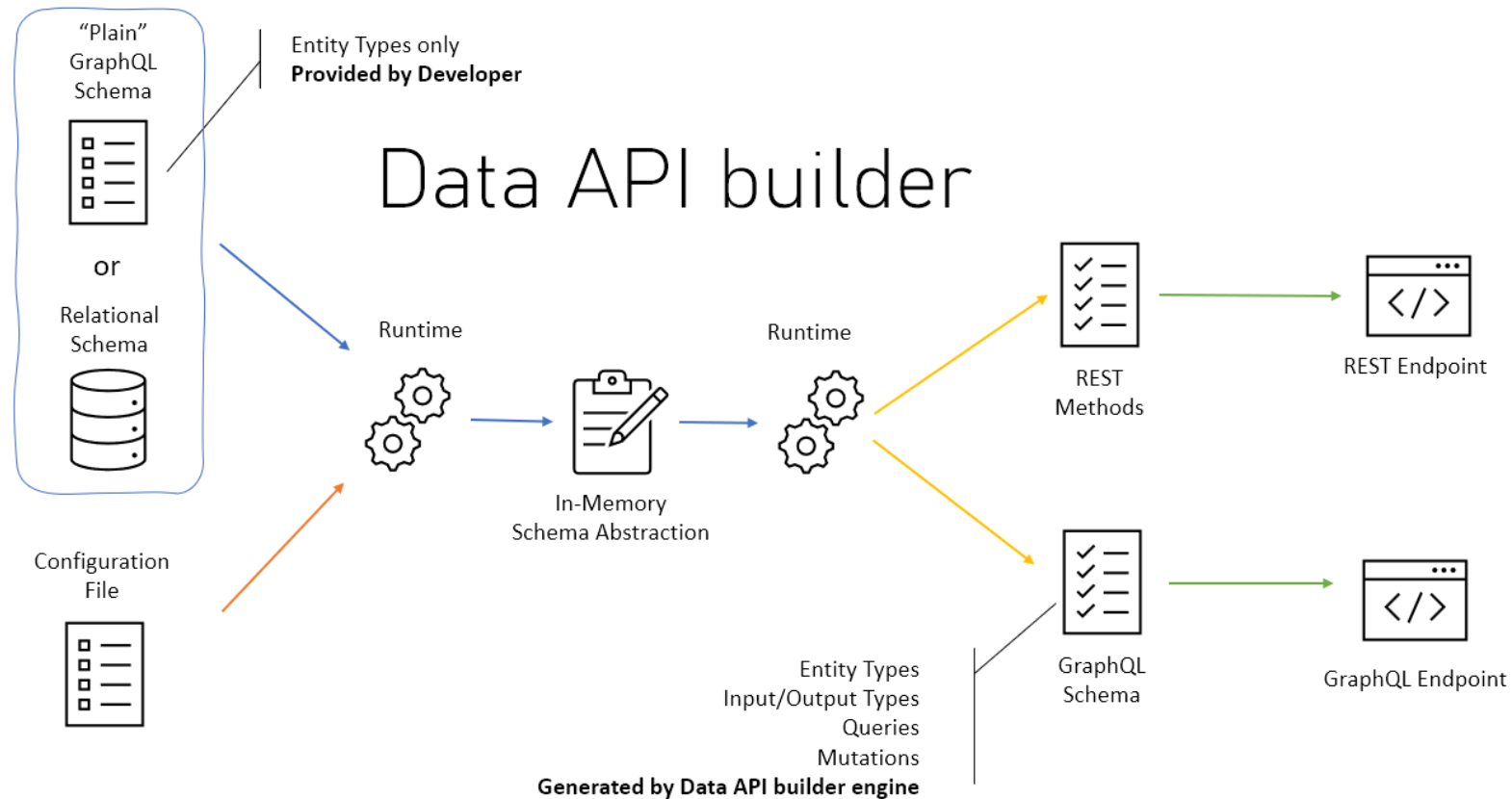Modern REST and GraphQL endpoints to your Azure databases

aka.ms/dab

- Open-source tool launched in March 2023, generally available in May 2024

- Instantly provides REST and GraphQL endpoints for tables, views, stored procedures, collections

- Full support for pagination, sorting, filtering, selection, relationships (GraphQL only)

- Works with SQL, PostgreSQL, MySQL and CosmosDb

- Built with Security in mind

  - Authentication via OAuth2 (AAD and EasyAuth)

  - Authorization via DAB policies (that access claims data)

- Easy Deployment

  - Distributed as NuGet package and Containerized Image

  - Integrated with Static Web Apps

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DAB : how does it work?

Modern REST and GraphQL endpoints to your Azure databases

aka.ms/dab

Getting started with Data API builder

Modern REST and GraphQL endpoints to your Azure databases

aka.ms/dab

- Install the tool

```
dotnet tool install -g Microsoft.DataApiBuilder
```

- Get a database connection and initialize the DAB configuration file

```
dab init --database-type mssql --connection-string "@env('SQL')"
```

- Add an entity

```
dab add SpecialDeals --source Sales.SpecialDeals --permissions "anonymous:*"
```

- Run DAB

```
dab start
```

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Anti-pattern ALERT !

DO NOT directly expose your database model!

- Avoid tight coupling between API and database model

- Do not expose all the database fields

- You might need to change data structures and types

- You might need to enrich the dataset with other sources

- Overusing some DB features can hurt performances

- …

Be mindful about technology Use vs Misuse

Cory House
@housecor

Just reviewed a web page making 55 fetch calls totaling 570k of JSON.
This one page is 1.6 MB.

Why 55 calls? Because each database table is exposed as an endpoint.
The UI joins all the JSON together via the provided foreign keys.

To be clear: Don't do this.

3:51 AM · Sep 30, 2023 · 1.1M Views

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A bit more about DAB

Integration with EntraID

```json
"authentication": {
  "provider": "AzureAD",
  "jwt": {
    "audience": "f65...e",
    "issuer": "https://login.microsoftonline.com/75...46/v2.0"
  }
}
```

Roles and actions

```json
{
  "role": "Executive",
  "actions": [
    "read"
  ]
},
```

DAB policies

```json
{
  "role": "Management",
  "actions": [
    {
      "action":"read",
      "policy": {
        "database": "@item.BuyingGroupName ne 'Tailspin Toys'"
      }
    },
    "create"
  ]
},
```

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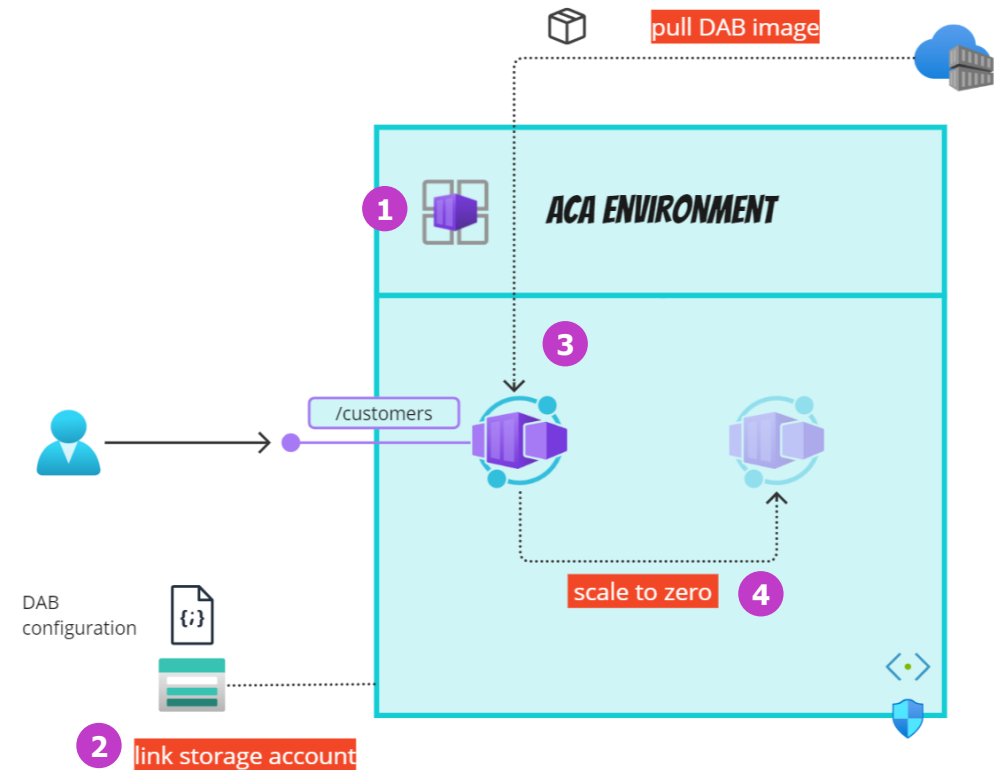
DEMO

Data API Builder intro

Do more with less

Optimize cost : Azure Container Apps

Manage less infrastructure and save cost

- **Easiest way** to run containers on Azure

- **Focus on apps**, not infrastructure (managed by Microsoft)

- **Scale to zero**

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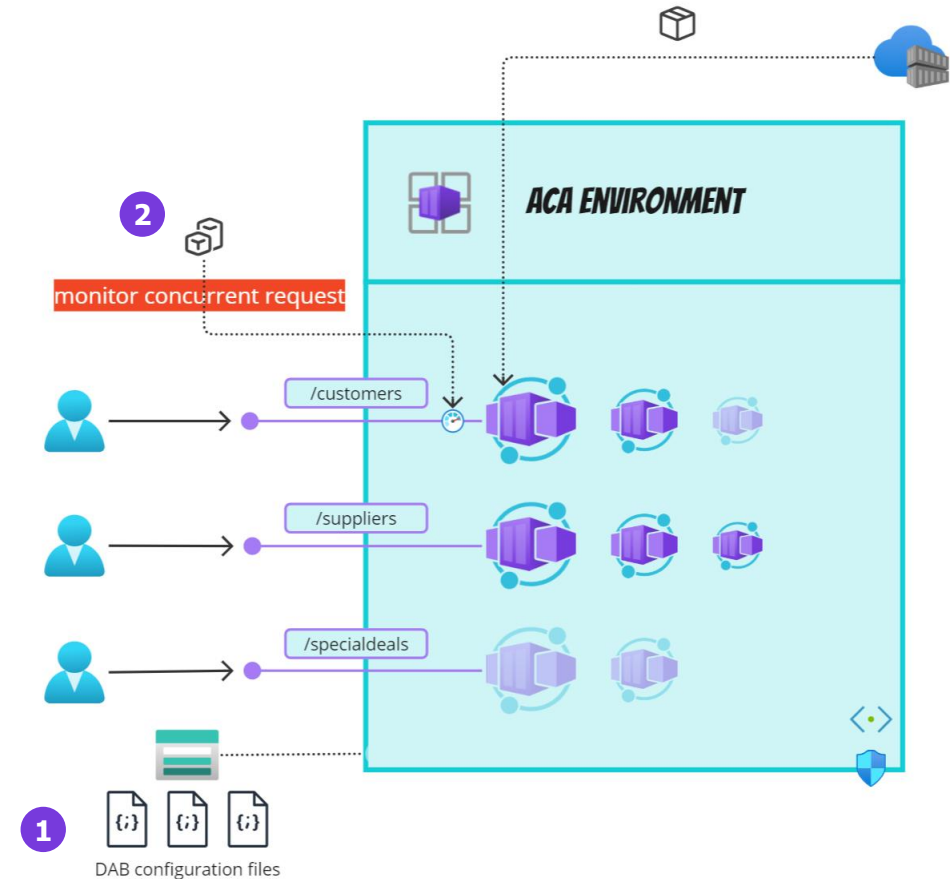
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Scale accordingly to the usage

Manage less infrastructure and save cost

- We can create one application per SQL view to be exposed (isolate and scale customers independently)

- Scale dynamically based on events

```
createOperation "Customers" 1 3
createOperation "Suppliers" 1 3
createOperation "SpecialDeals" 0 2
```

ACA ENVIRONMENT

monitor concurrent request

/customers

/suppliers

/specialdeals

DAB configuration files

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Optimize resource with DAB caching

Increase service availability and performances

- **Powered by FusionCache**

- **Cache in memory**

- **Ready for a 2nd level**

- **Benefits**

    - **Improve performance**

    - **Cost optimization**

    - **Better user exp**

    - **Protect your database**

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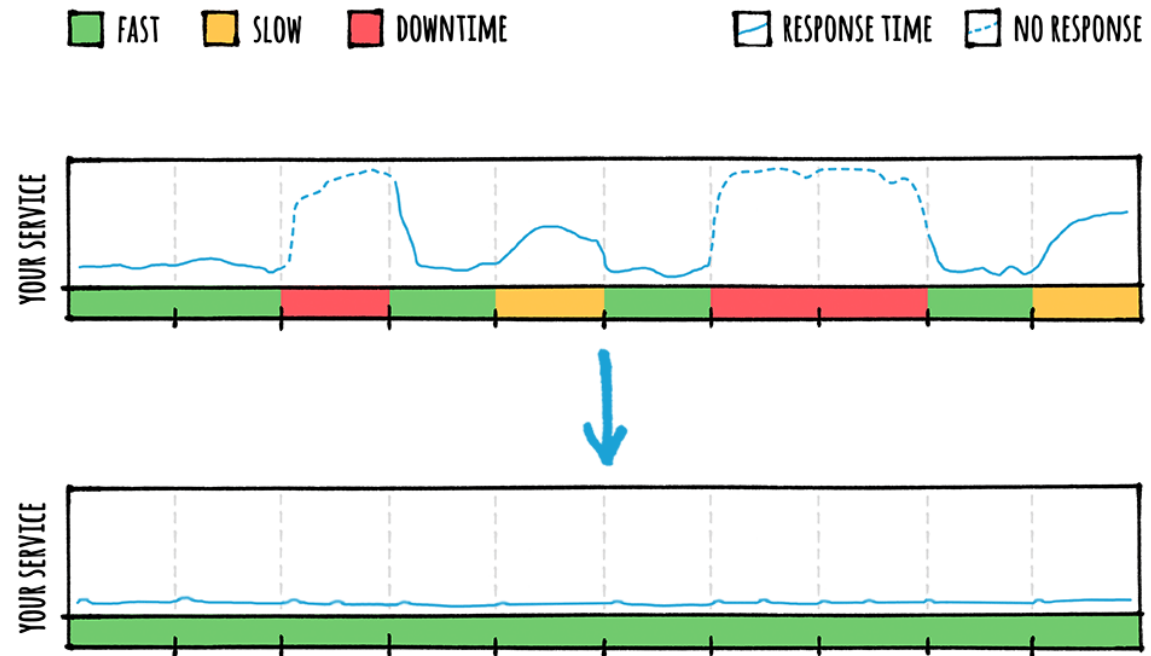
DEMO
Manage less infrastructure and save cost

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Operate confidently
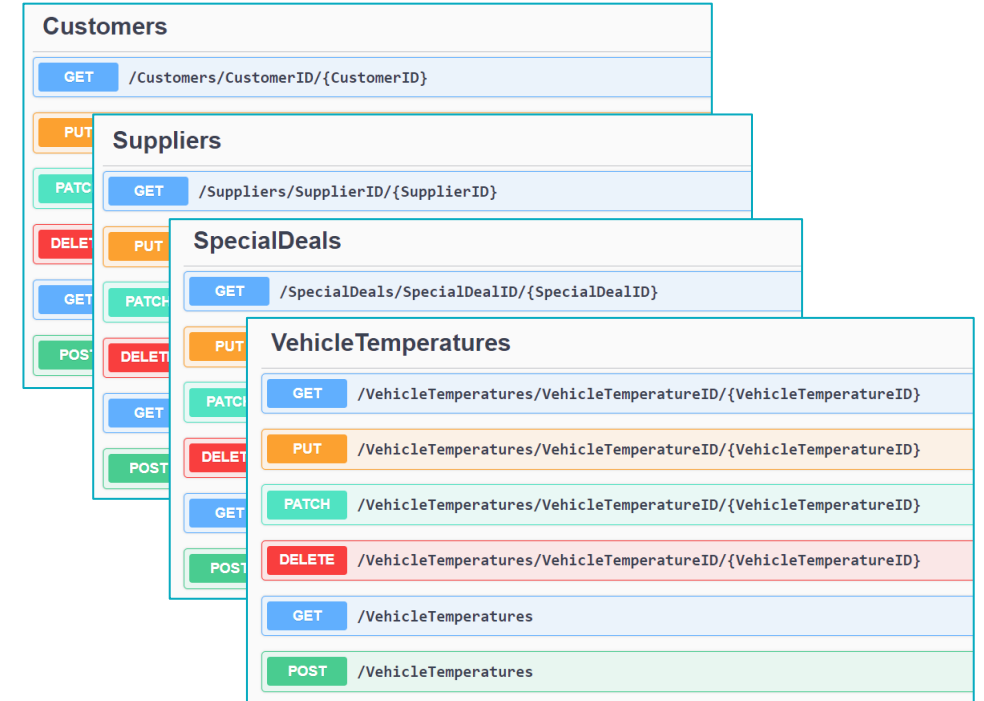
… too many public endpoints

Meaning

- **Bigger** attack surface

- **Complex** too consume

- Complex to **maintain**

https://my-customers. icytree-7cd380c3.azurecontainerapps.io/api/customers

https://my-suppliers. icytree-7cd380c3.azurecontainerapps.io/api/suppliers

https://my-specialdeals. icytree-7cd380c3.azurecontainerapps.io/api/specialdeals
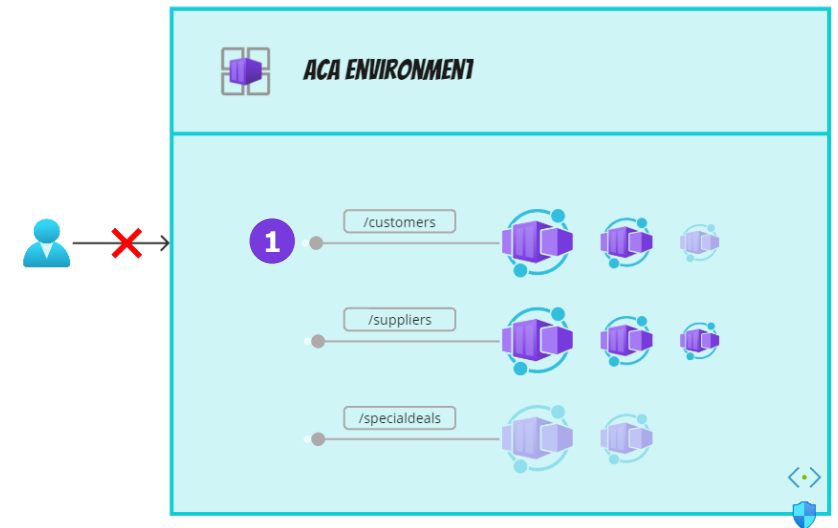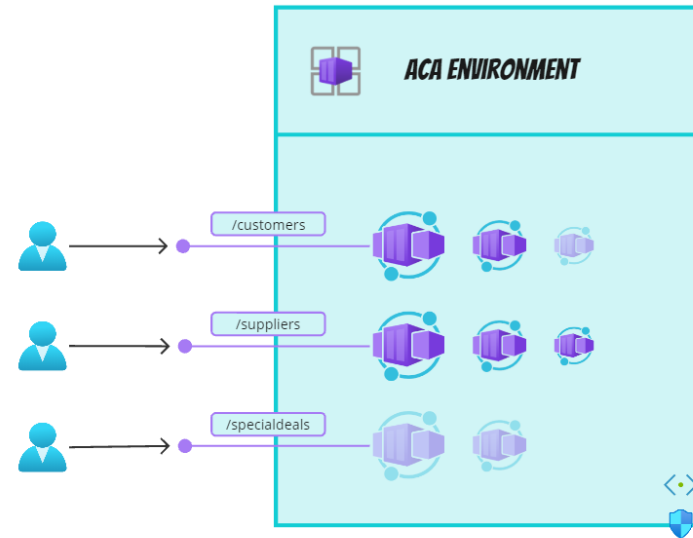
https://my- vehicletemperatures. icytree-7cd380c3.azurecontainerapps.io/api/vehicletemperatures

... too many public endpoints

Meaning

- ~~Bigger~~ attack surface

   1 → turn ACA applications to internal

- Complex too consume

- Complex to maintain

Operate confidently : Azure API Management to the rescue!

Meaning

- ~~Bigger~~ ~~attack surface~~

  1 → turn ACA applications to internal

- ~~Complex~~ ~~too consume~~

  2 → single endpoint exposed via APIM

- ~~Complex to maintain~~

  3 → decouple public version from internal version

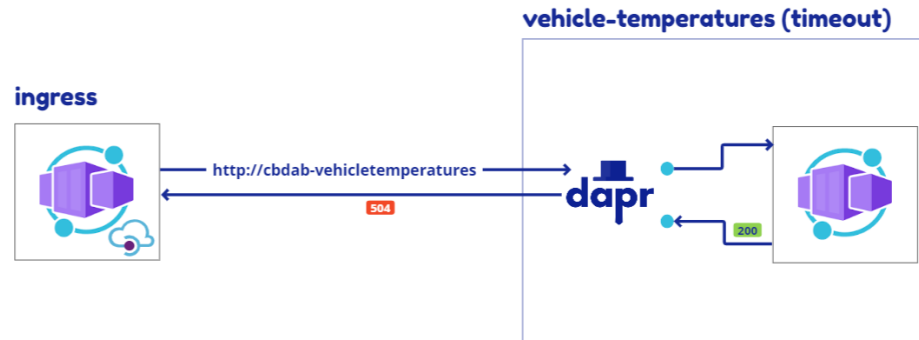DAB configuration files

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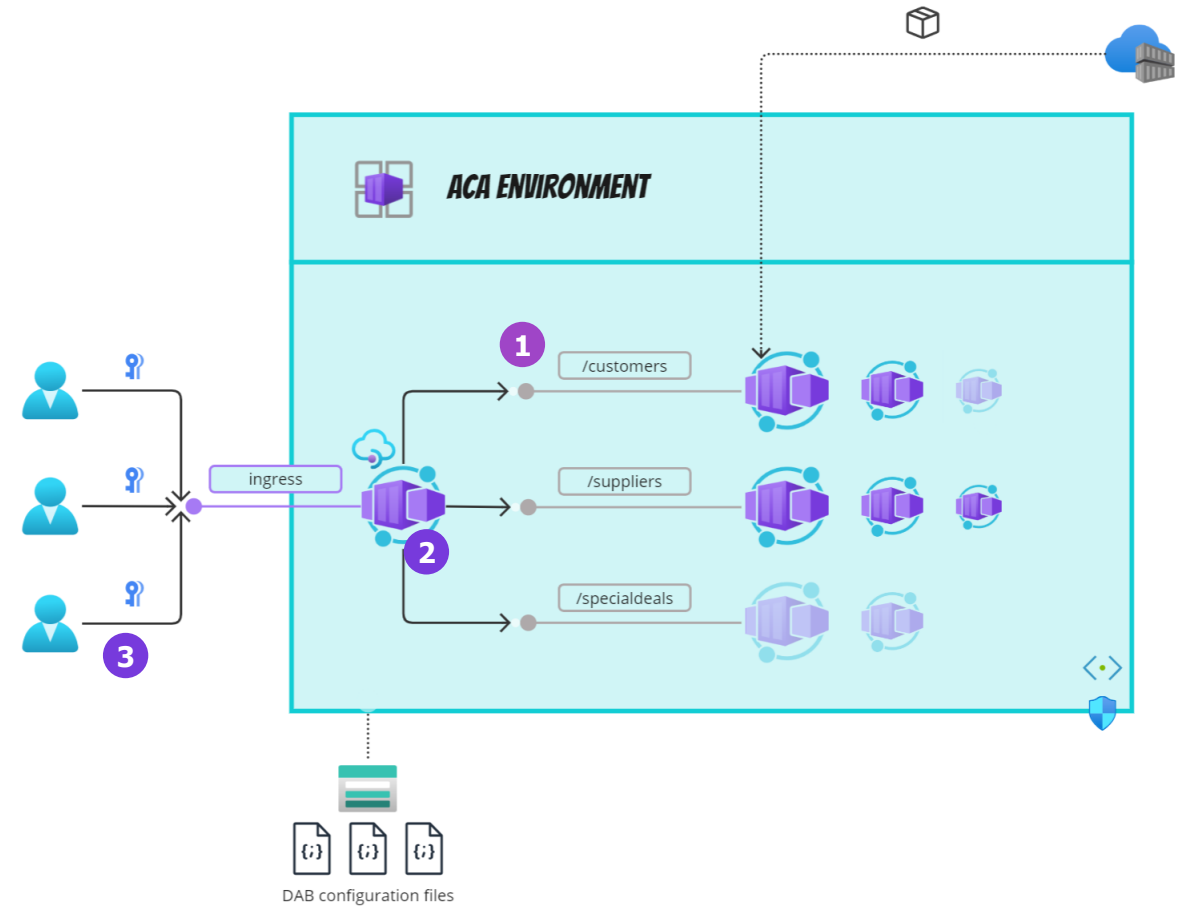
Operate confidently : Azure API Management

Full control on the API

- Control which operations to exposed and which not

- Implement throttling policies

- Implement resiliency (on ACA or on APIM backends)

- Mask internal implementation details

- More ...

```xml
1   <policies>
2       <inbound>
3           <base />
4           <rate-limit-by-key calls="60" renewal-period="60"
5               counter-key="@(String.Concat("success_", context.Request.IpAddress))"
6               increment-condition="@(context.Response.StatusCode >= 200 && context.Response.StatusCode < 300)" />
7
8           <rate-limit-by-key calls="20" renewal-period="60"
9               counter-key="@(String.Concat("fail_", context.Request.IpAddress))"
10              increment-condition="@(context.Response.StatusCode >= 400)" />
11      </inbound>
12      <backend>
13          <base />
14      </backend>
15      <outbound>
16          <base />
17      </outbound>
18      <on-error>
19          <base />
20      </on-error>
21  </policies>
```
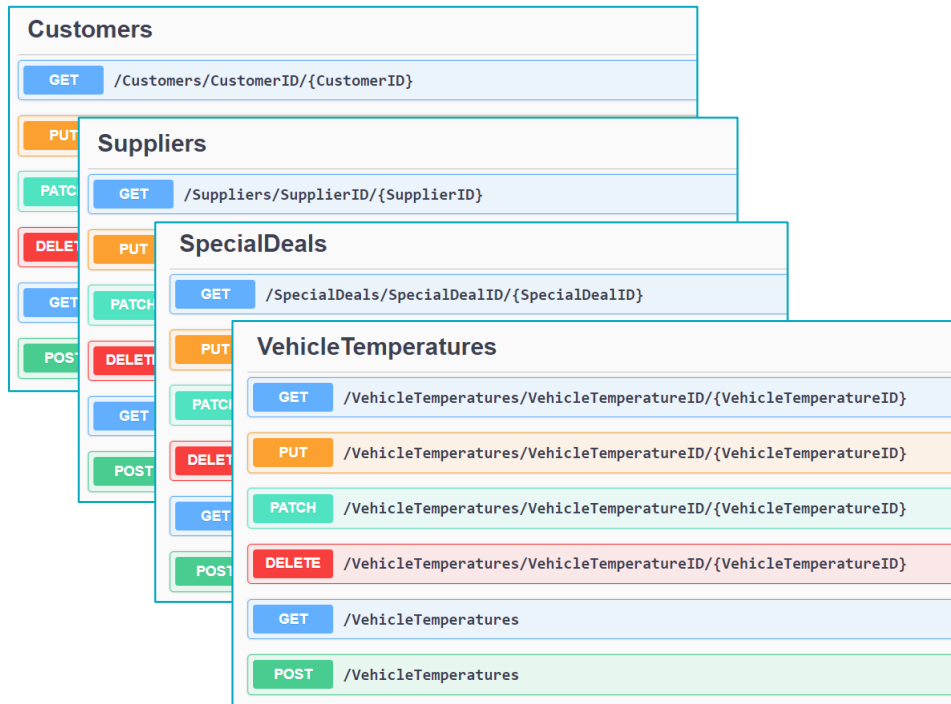

vehicle-temperatures (timeout)

ingress

http://cbdab-vehicletemperatures

504

dapr

200

DEMO

Secure and govern your APIs

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RECAP : Build a secure, cost-optimized, dynamic data API in minutes

Customers

GET	/Customers/CustomerID/{CustomerID}
PUT	
PATC	
DELET	
GET	
POST	

Suppliers

GET	/Suppliers/SupplierID/{SupplierID}
PUT	
PATCH	
DELET	
GET	
POST	

SpecialDeals

GET	/SpecialDeals/SpecialDealID/{SpecialDealID}
PUT	
PATCH	
DELET	
GET	
POST	

VehicleTemperatures

GET	/VehicleTemperatures/VehicleTemperatureID/{VehicleTemperatureID}
PUT	/VehicleTemperatures/VehicleTemperatureID/{VehicleTemperatureID}
PATCH	/VehicleTemperatures/VehicleTemperatureID/{VehicleTemperatureID}
DELETE	/VehicleTemperatures/VehicleTemperatureID/{VehicleTemperatureID}
GET	/VehicleTemperatures
POST	/VehicleTemperatures

GET	/api/v1/customers	Get customers
GET	/api/v1/suppliers	Get suppliers
GET	/api/v1/vehicletemperatures	Get vehicletemperatures
GET	/api/v1/specialdeals	Get specialdeals

- Single endpoint
- Filter operations
- Better Governance and Security

DATA SPRINT

Takeaways

Quick time to market

- Data API Builder is a quick, secure and scalable way to surface your data via an HTTP endpoint.
- The REST endpoint guarantee better interoperability and integration.

Optimize Cost

- PaaS components comes with abstracted infrastructure and softer learning curve.
- Scale to zero if needed.
- DAB reduce to the minimum the cost to expose a new dataset.
- Reduce the database access with in-memory caching

Empower developers

- DAB and APIM natively integrates with EntraID (AAD)
- Stricter security and governance with APIM
- Fault tolerant application with ACA resiliency

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Thank you

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