Visual Studio LIVE! | Las Vegas

EXPERT SOLUTIONS FOR ENTERPRISE DEVELOPERS

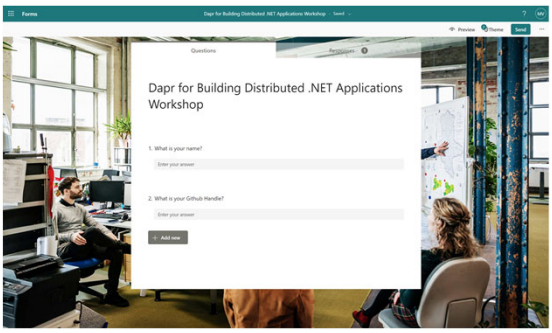
Dapr for Building Distributed .NET Applications Workshop

Alex Thissen &
Marcel de Vries
Coding Architect &
Coding Executive Officer
Xpirit

#VSLIVE

Your Code Powers the World.
Our Training Powers You.

We need your GitHub Handle!



https://forms.office.com/r/YQn0MzaufL

Outline

What problem is solved?

How does DAPR work?

Open telemetry

What is Dapr?

Xpirit

"APIs for building portable and reliable microservices
Leverage industry best practices and focus on your application's logic."

https://dapr.io/

Xpirit

Why Would You Want to Use Dapr?

- Simplify your codebase
- Interchangeability
- Testability
- Solve standard microservices complexity
- Build vendor agnostic solution

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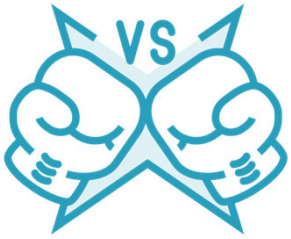
Who is Behind Dapr?

Xpirit

Who is Behind Dapr?

Community Driven
&
Open Source



Vendor & Language neutral

CLOUD NATIVE COMPUTING FOUNDATION

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Common Problems when Building Microservices

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Common Problems when Building Microservices

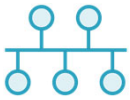
Insecure communication

Runtime errors hard to find

Service discovery

Overall system health and performance insights

Transient errors



Decoupling through messaging (pub/sub)

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Common Industry Solutions

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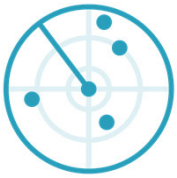
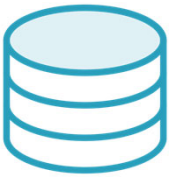
Industry Established Best Practices for Reliability

Secured Connections

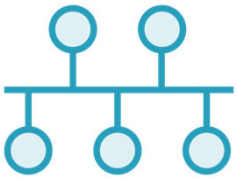


Observability

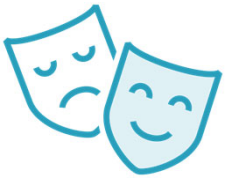


Resilient State

Retries



Message Guarantee



Reliable Actors

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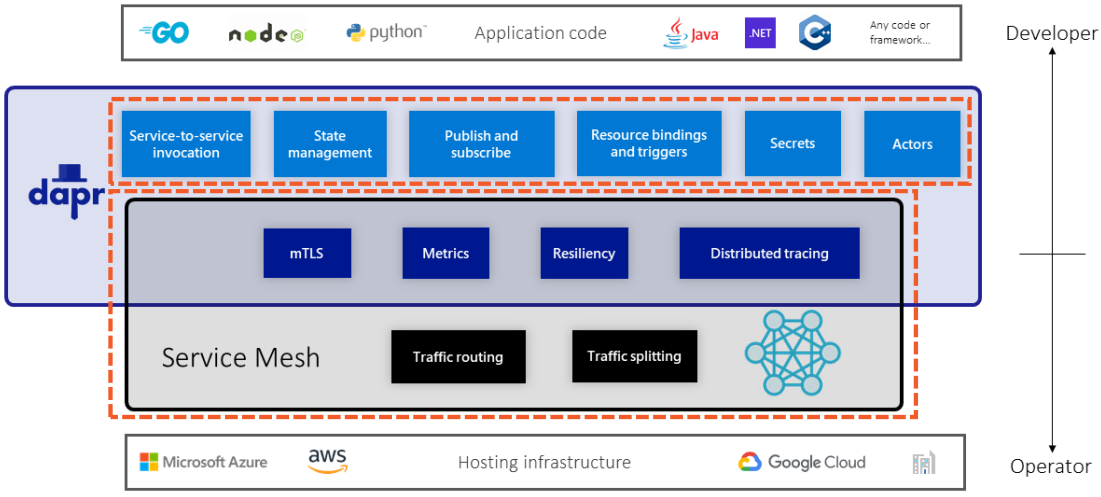
Industry Established Best Practices



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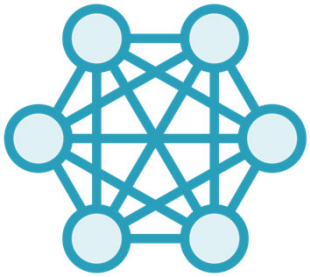
Dapr, a service mesh, or both?

Use one or more building blocks
+
Language & platform agnostic

Corporate policy
+
Building blocks



Capabilities not provided by Dapr

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Solving Common Microservices Challenges

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Solving Common Microservices Challenges

Sidecar architecture based on APIs

Building blocks provide interchangeability

Language and vendor agnostic implementation

Built and supported by the community and CNCF

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Core Dapr Concepts

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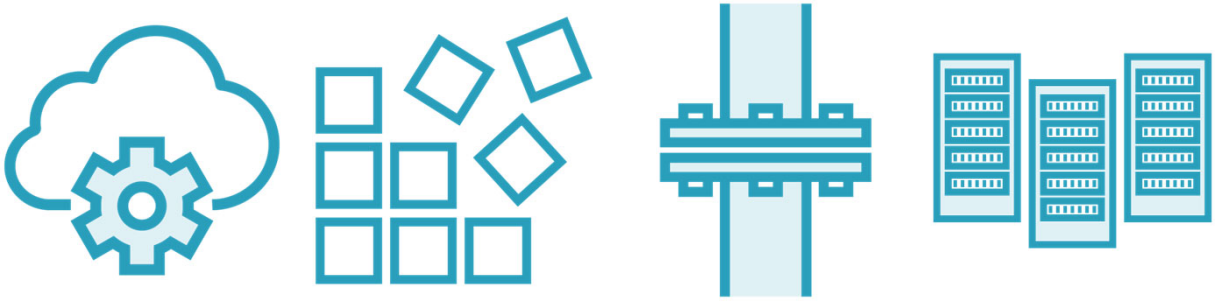
Core Dapr Concepts



Application
==
Microservice

Building Block
+
Configuration

Middleware

Hosting

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Results of Applying One Building Block

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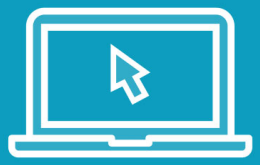
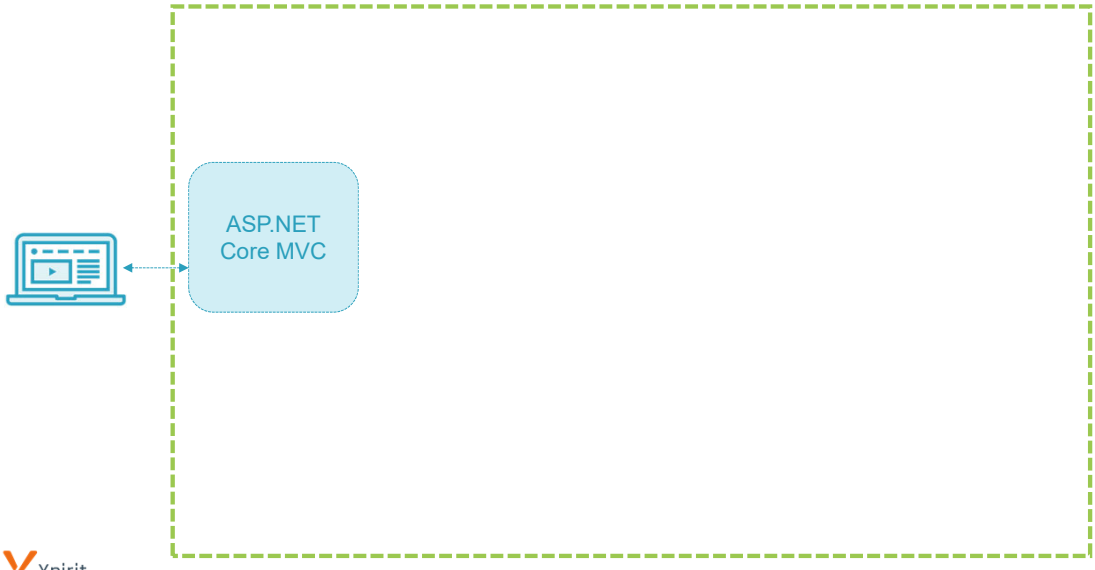
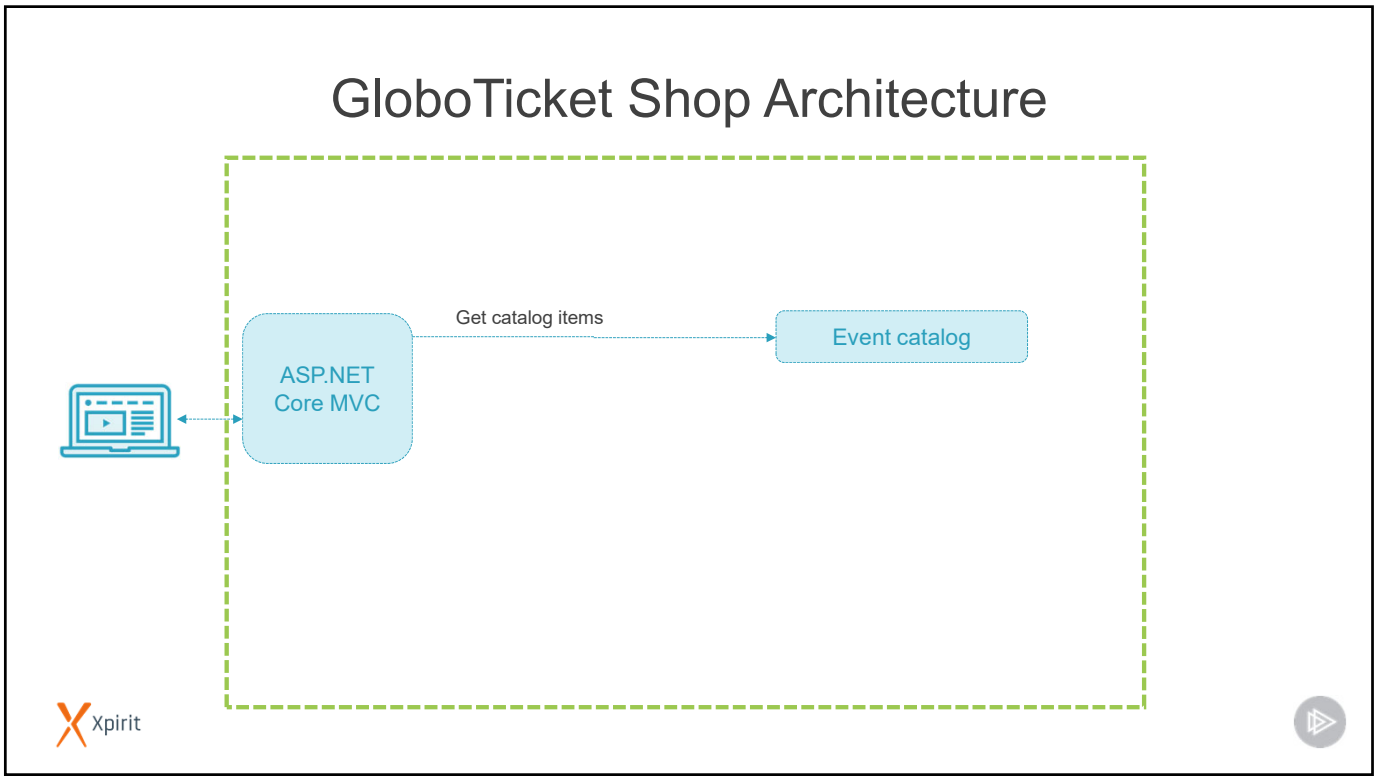
Demo

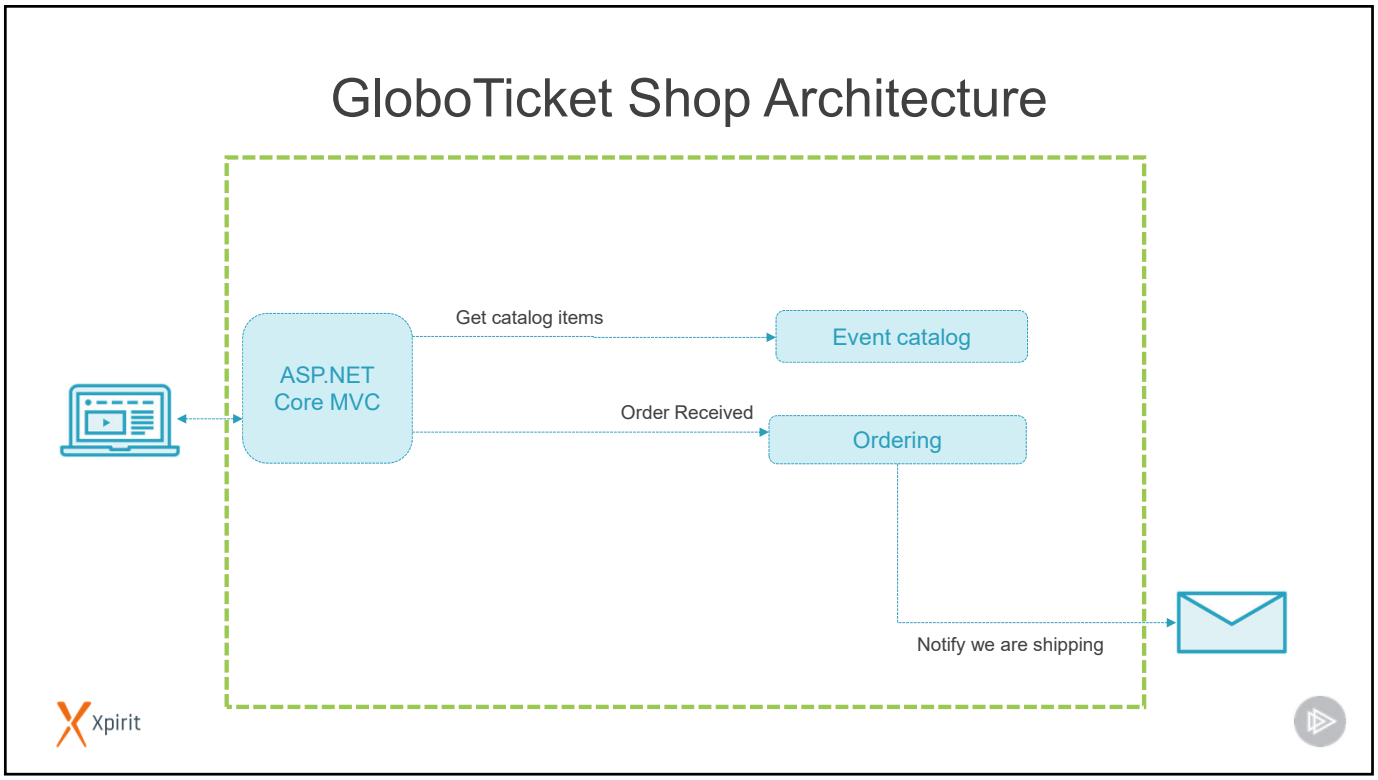


Start application Globo Ticket

GloboTicket Shop Architecture




GloboTicket Shop Architecture
ASP.NET
Core MVC
Get catalog items
Event catalog
Xpirit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Ordering
Notify we are shipping
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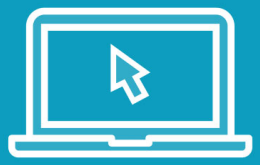
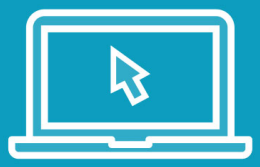
Demo

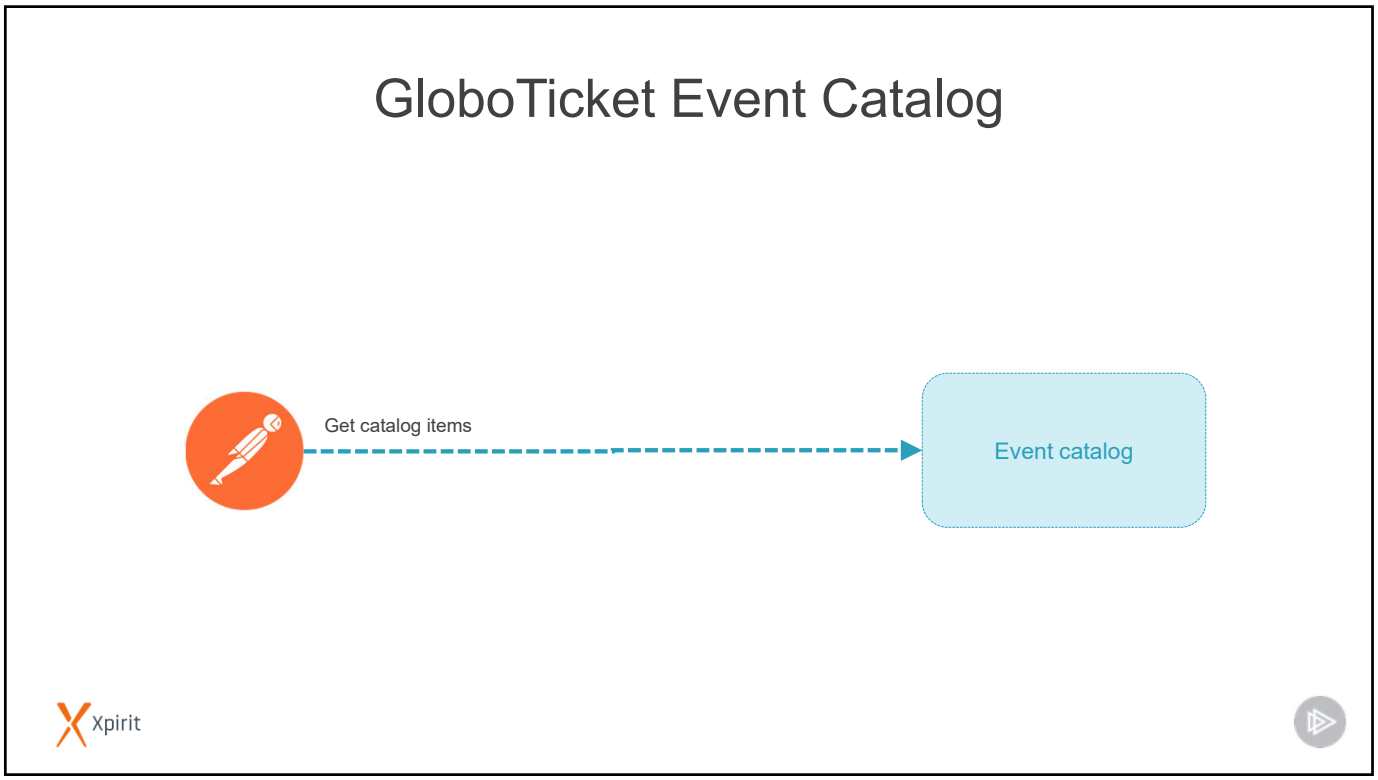


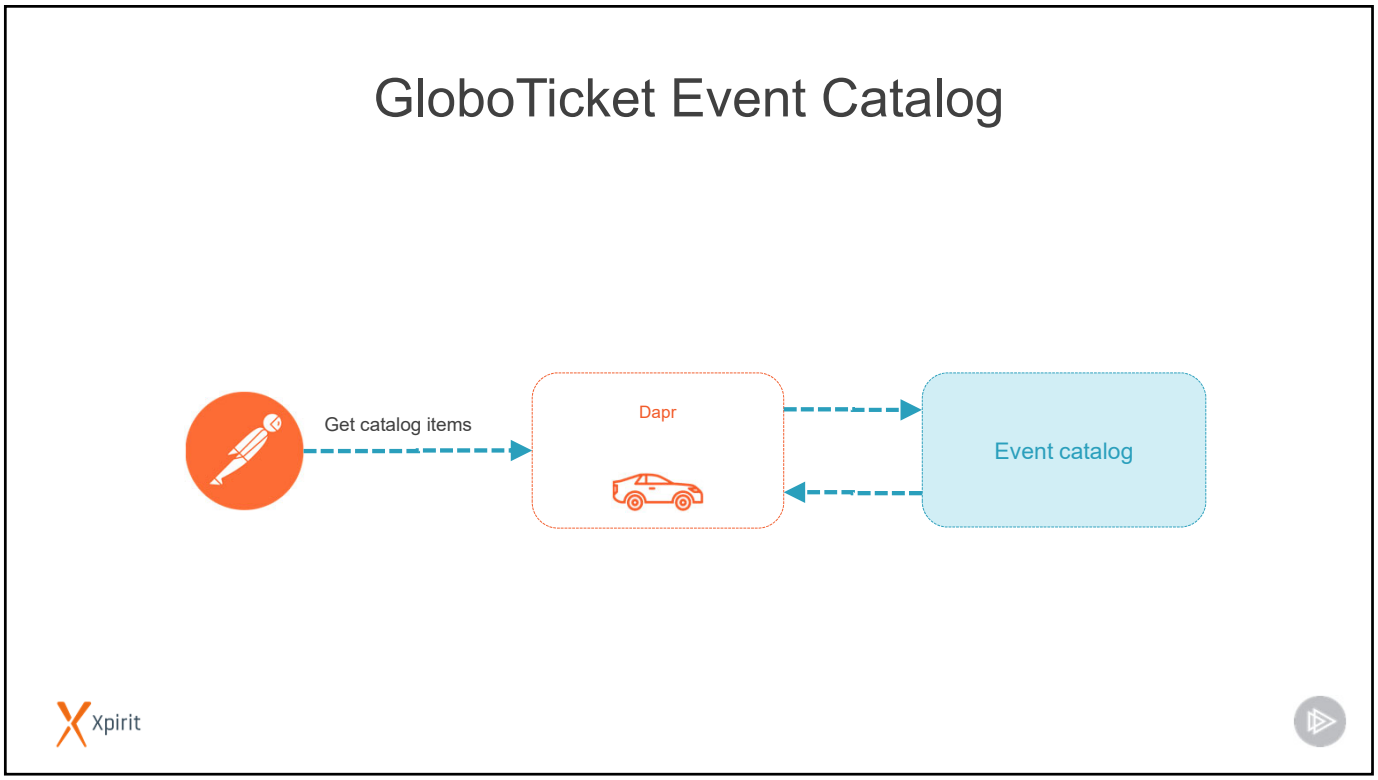
Start application Globo Ticket

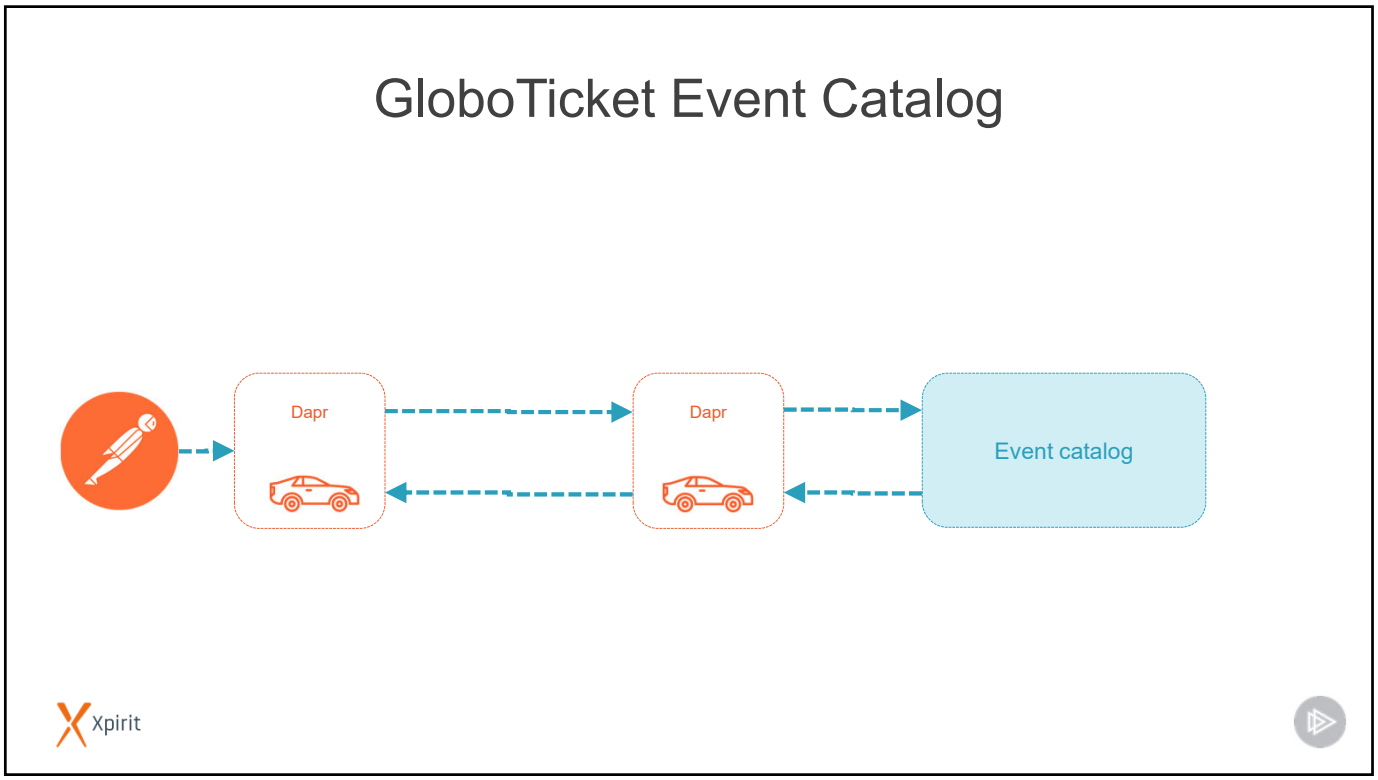
Demo

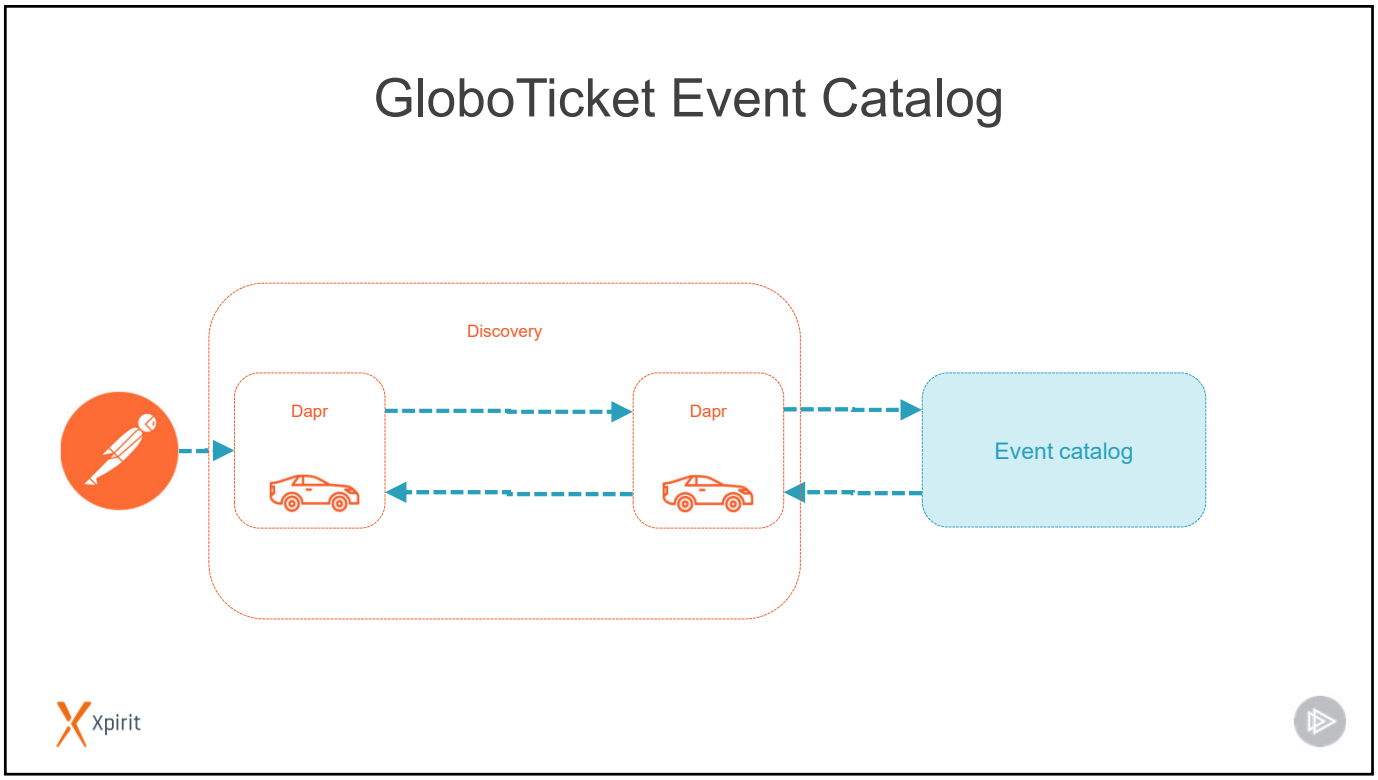


Add Dapr service invocation building block

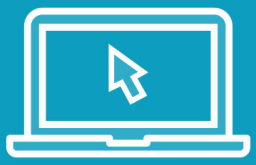

GloboTicket Event Catalog
Get catalog items
Event catalog
Xpirit


GloboTicket Event Catalog
Get catalog items
Dapr
Event catalog
Xpirit


GloboTicket Event Catalog
Dapr
Dapr
Event catalog
Xpirit

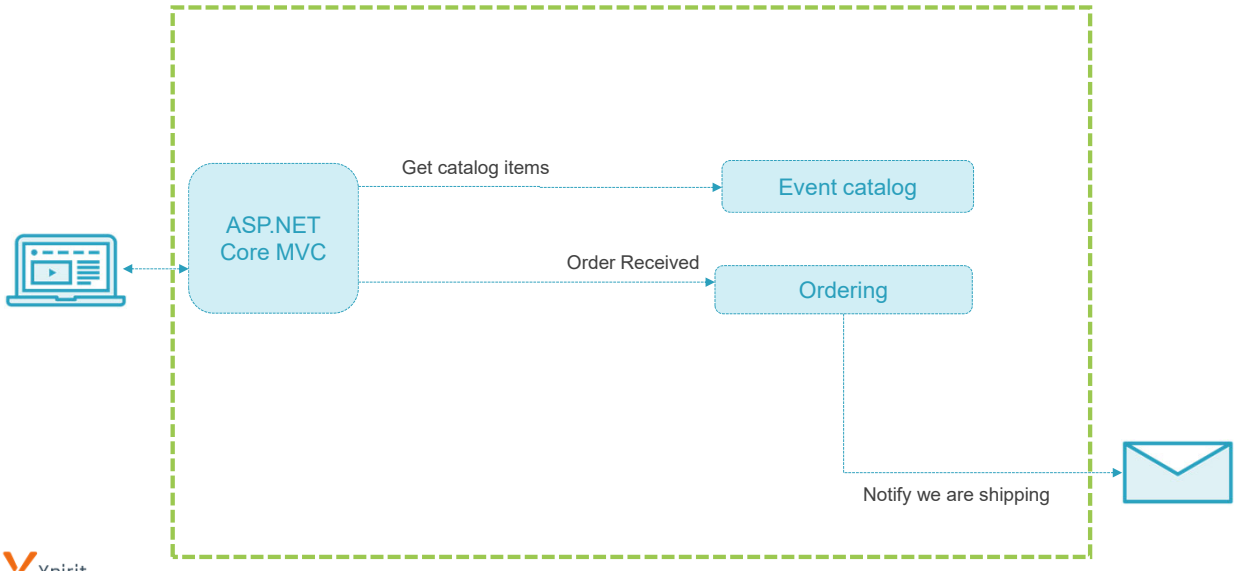

GloboTicket Event Catalog
Discovery
Dapr
Dapr
Event catalog
Xpirit

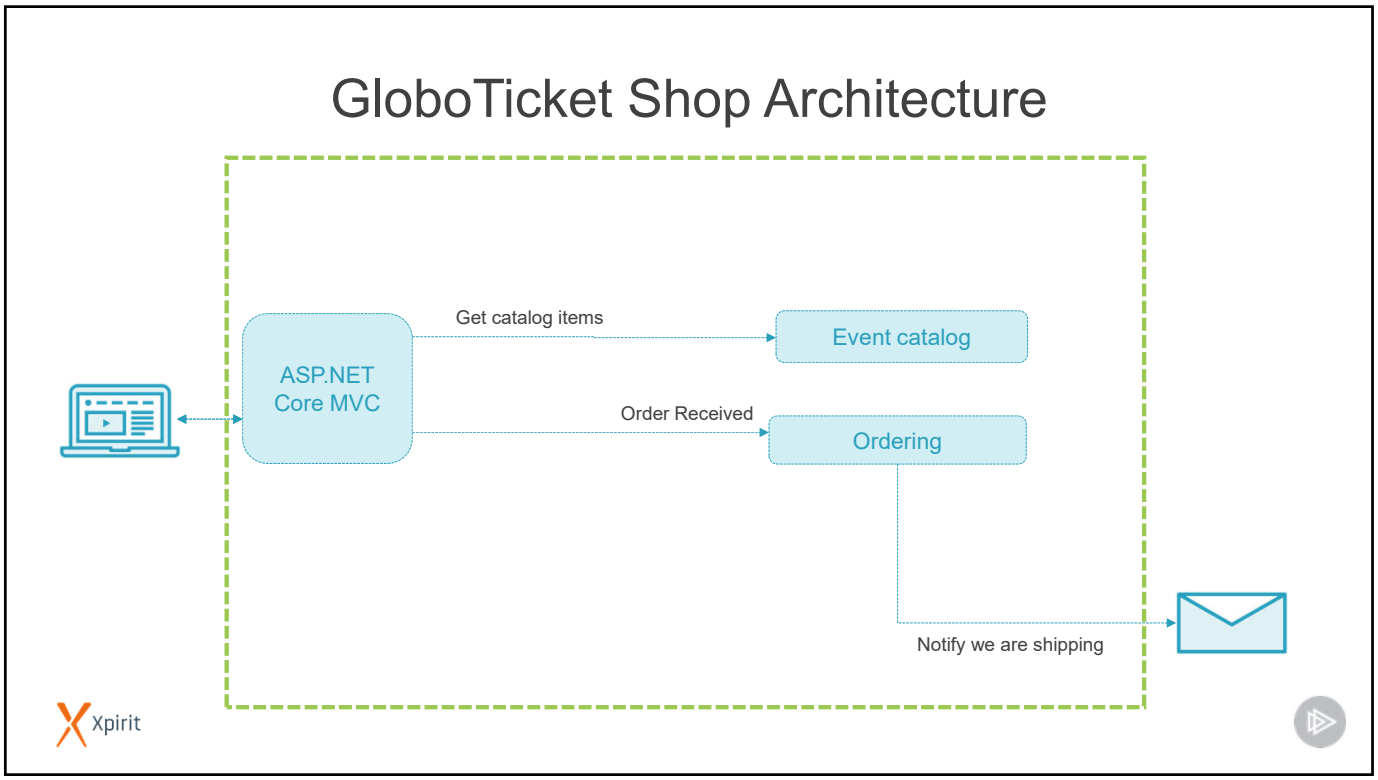
Demo



Add Dapr service invocation building block to Globo Ticket

GloboTicket Shop Architecture

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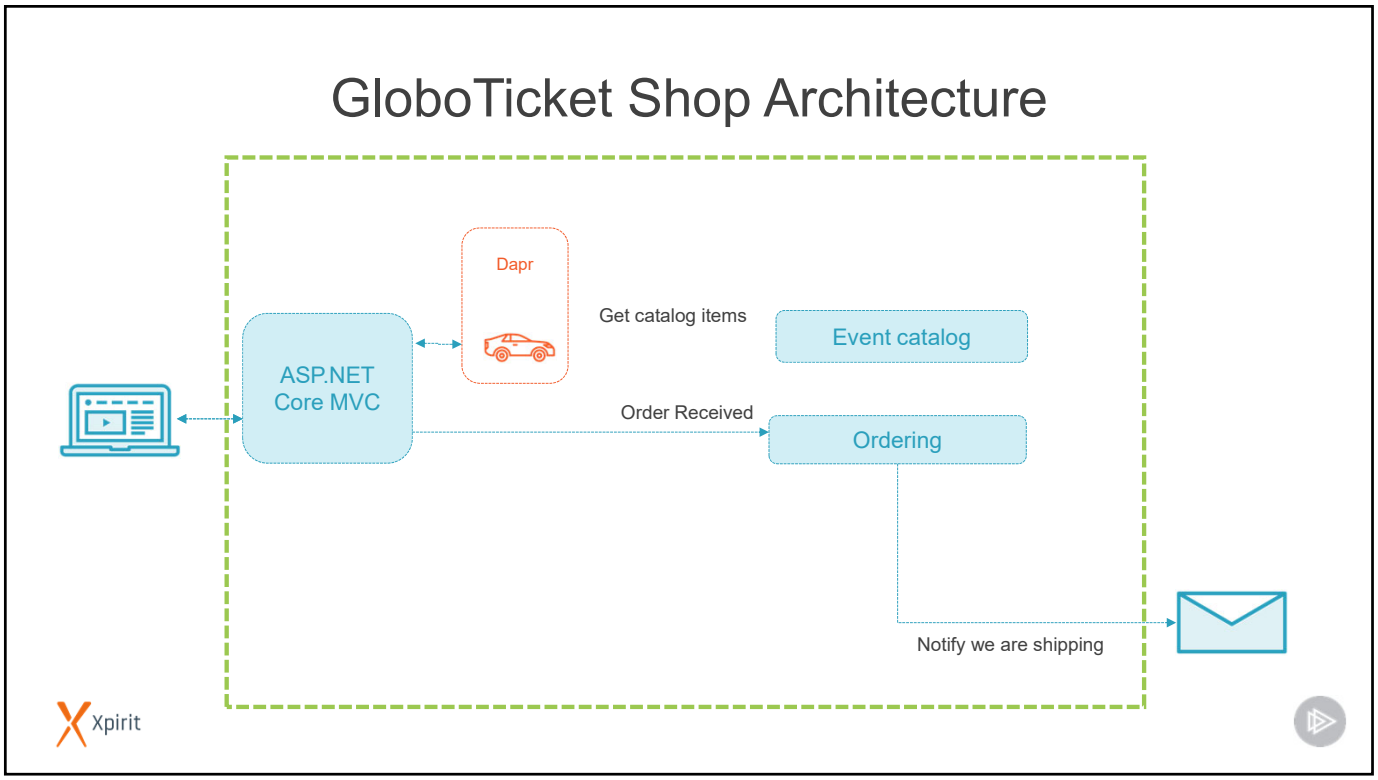
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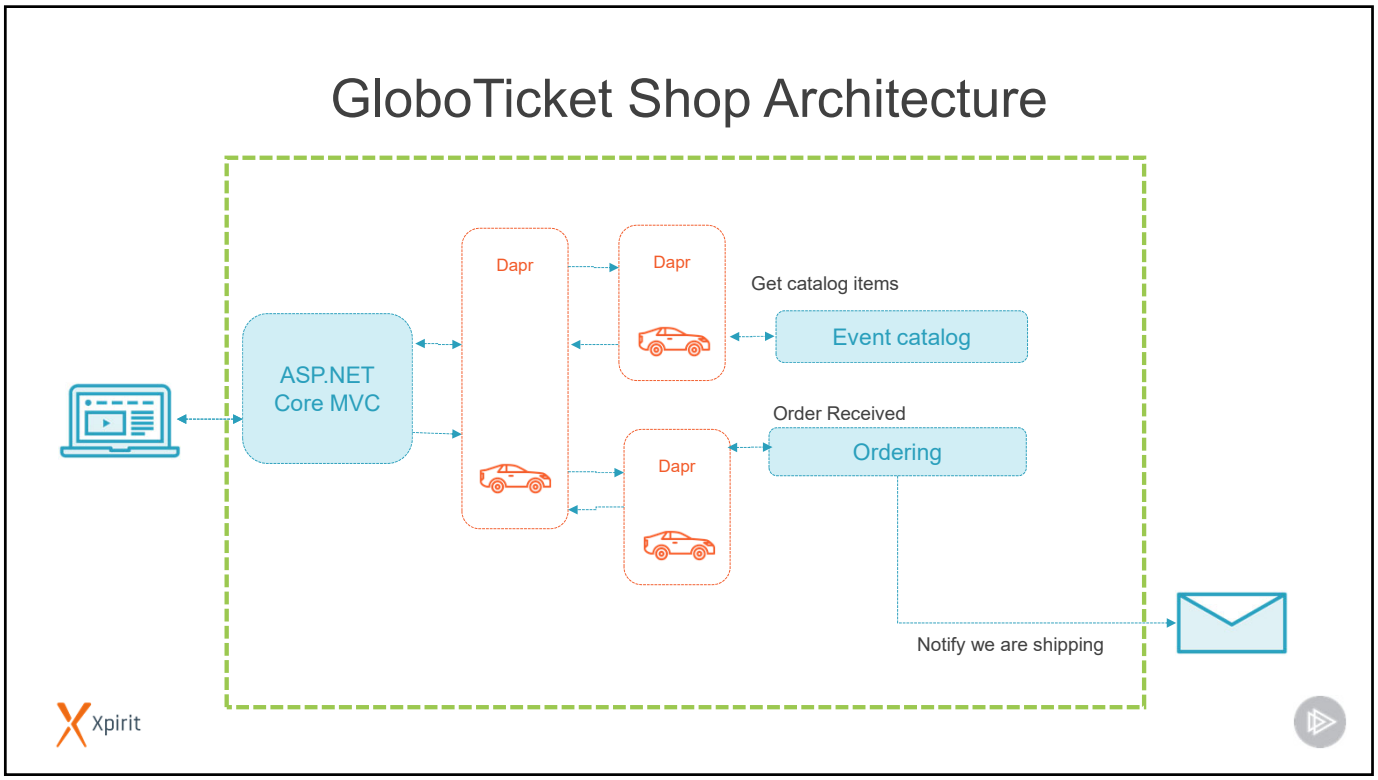
GloboTicket Shop Architecture
ASP.NET Core MVC
Dapr
Dapr
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Dapr
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Notify we are shipping
Xpirit


Demo
Add Dapr service invocation building block

How Does Dapr Work?

Marcel de Vries
CTO

@marcelv https://fluentbytes.com

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The Dapr Architecture

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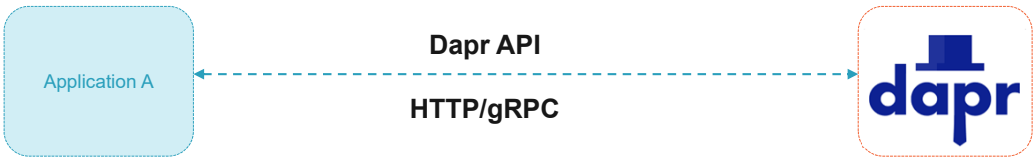
Dapr Architecture



POST http://localhost:3500/v1.0/**invoke**/cart/method/neworder

GET http://localhost:3500/v1.0/**state**/inventory/item123

POST http://localhost:3500/v1.0/**publish**/shipping/neworder

GET http://localhost:3500/v1.0/**secrets**/keyvault/password

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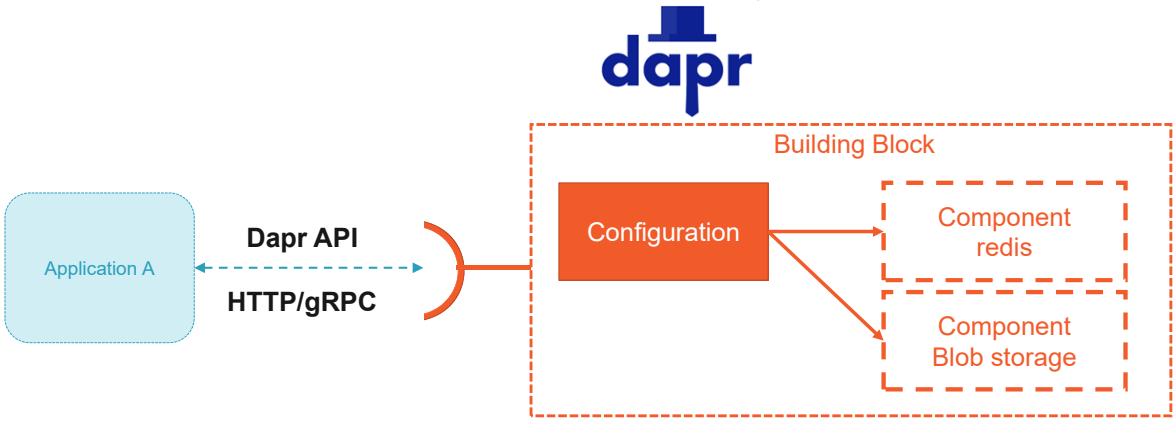
Dapr Architecture



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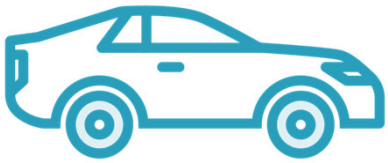
The Dapr Sidecar



Common industry architectural pattern

Implements the APIs

Uses building blocks to implement capabilities

1:1 mapping between application and sidecar

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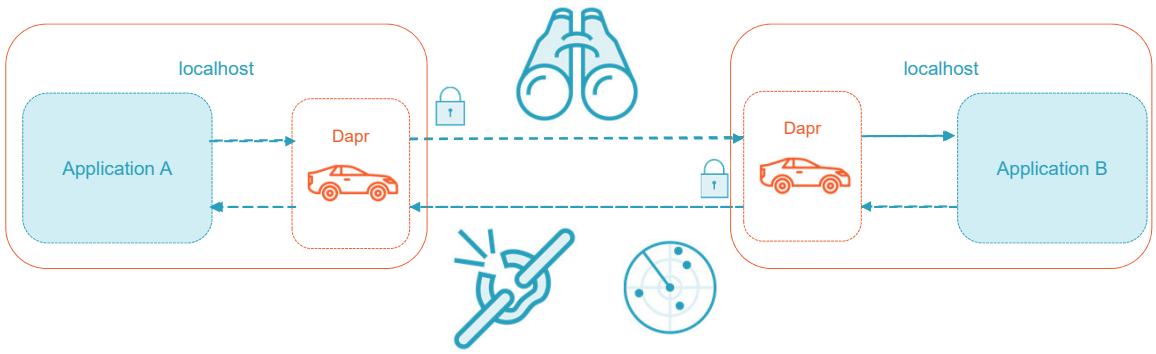
The Dapr Sidecar



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Dapr Building Blocks

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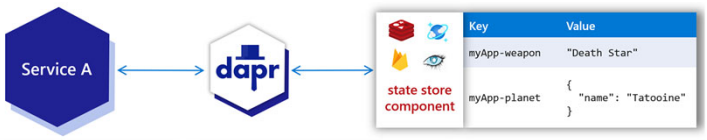
State Management Building Block

Setting the choices on concurrency control and data consistency.

Performing bulk CRUD operations, including multiple transactional operations.

Querying and filtering the key/value data.



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https://docs.dapr.io/reference/components-reference/supported-state-stores/

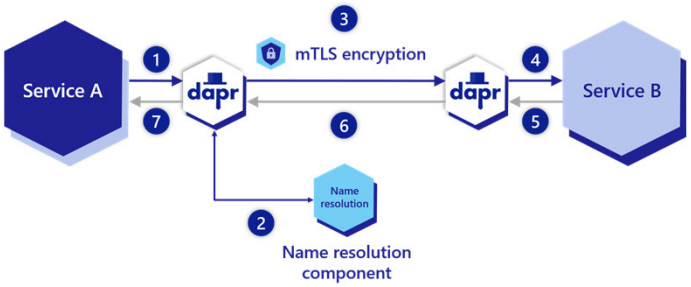
Service Invocation Building Block

Service discovery

Secure communication

Retries

Tracing



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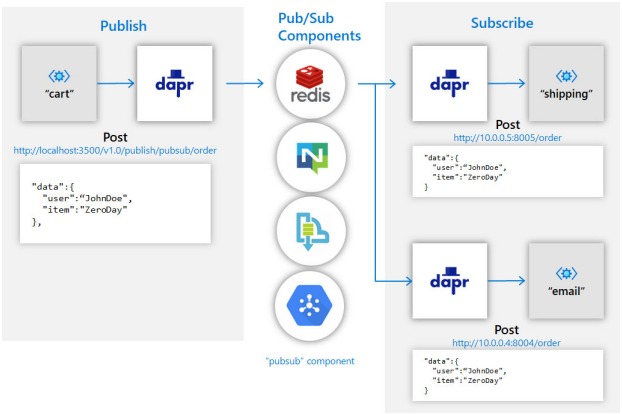
Publish Subscribe Building Block

Decoupling of services

No vendor specific SDK's &
No handling of the infrastructure

Cloud Events Specification



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https://docs.dapr.io/reference/components-reference/supported-pubsub/

Input / Output Bindings Building Block

Input from external resource

Output to external resource

Remove complexities

Focus business logic

Interchangeability

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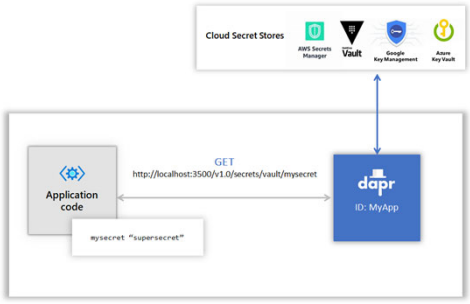
Secret Management Building Block

No vendor specific SDK's

No boilerplate code required

Retrieve and reference secrets in common way



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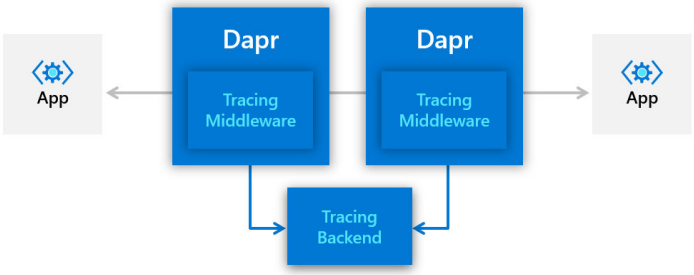
Observability Building Block

Full end to end tracing

Automatic correlation

Independent of implementation stack of microservice

Zipkin & Open Telemetry



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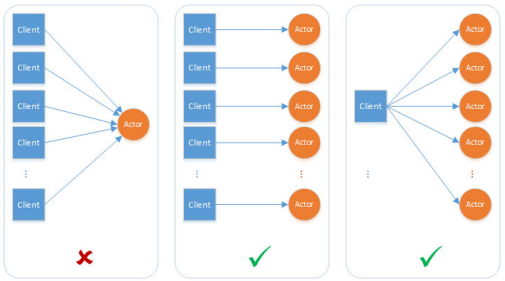
Virtual Actors Building Block

Virtual Actor Pattern

Large number of small, independent and isolated units

Single threaded



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What is Dapr middleware?

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Dapr Middleware

- W3C tracing
- OAuth2 authorization flow
- Bearer token verification
- Rate limiting

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Supported Hosting Models

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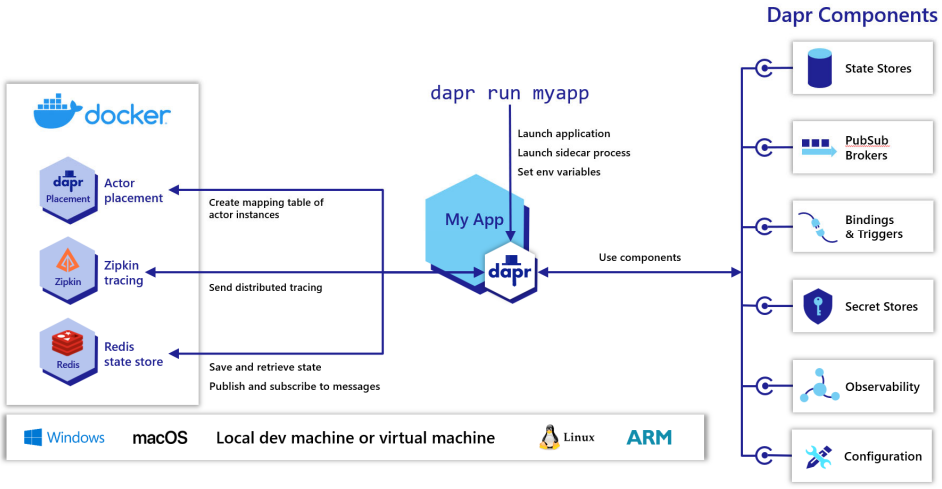
Self Hosted Model



Self Hosted + Docker model

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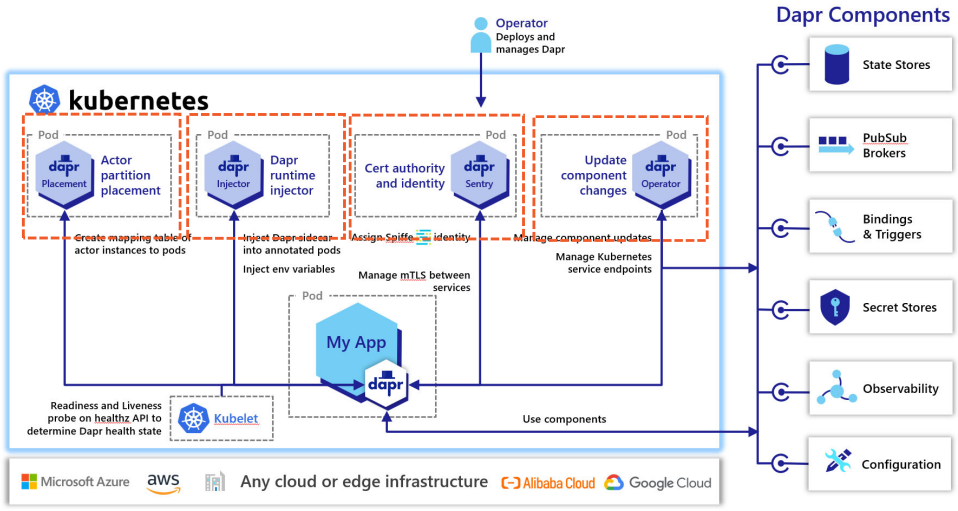
Kubernetes



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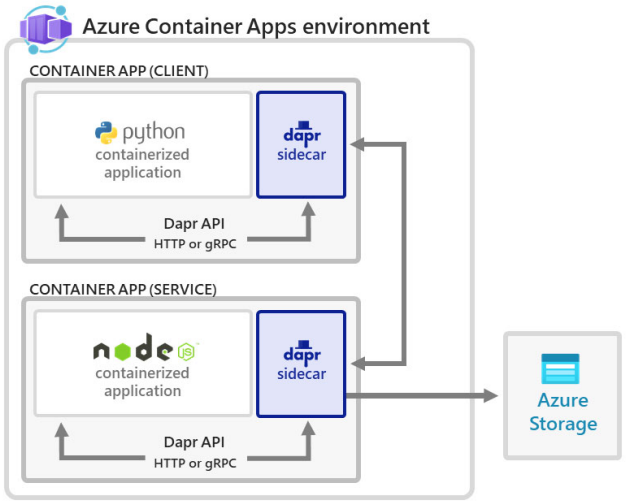
Supported Hosting Models



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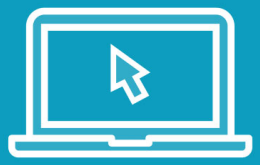
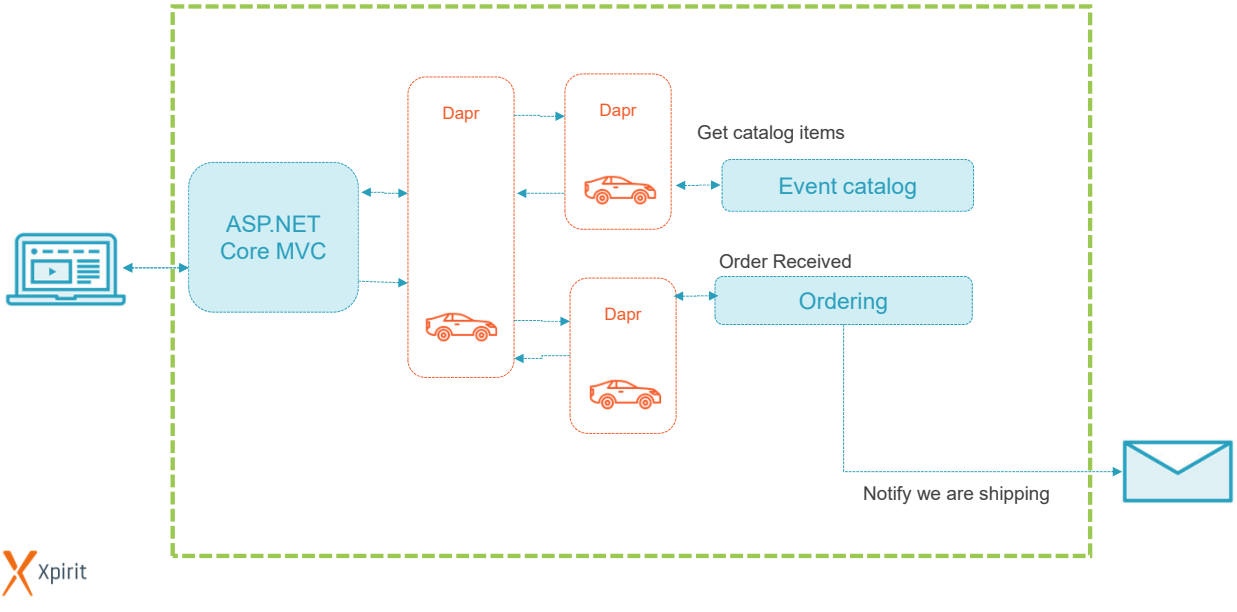
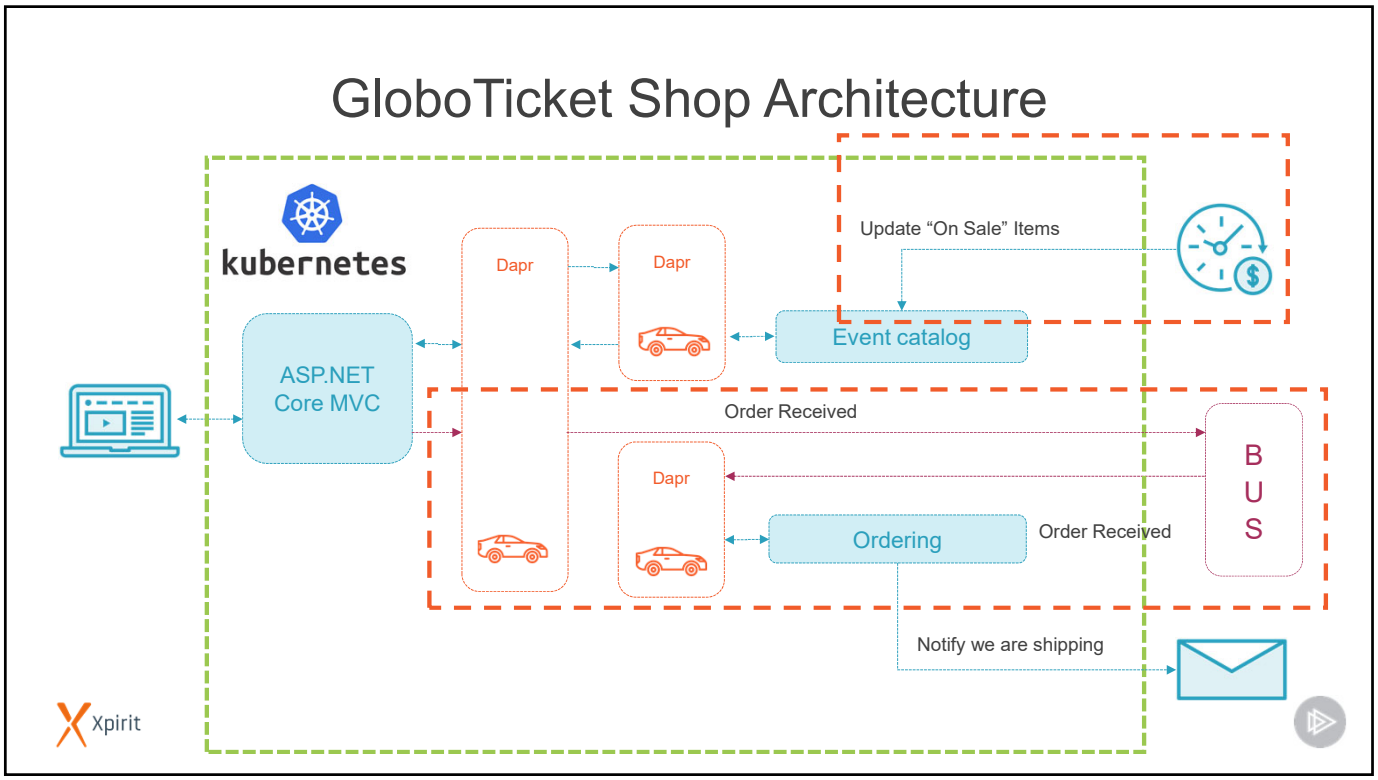
Demo



Hosting in Kubernetes

GloboTicket Shop Architecture

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kubernetes
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Update "On Sale" Items
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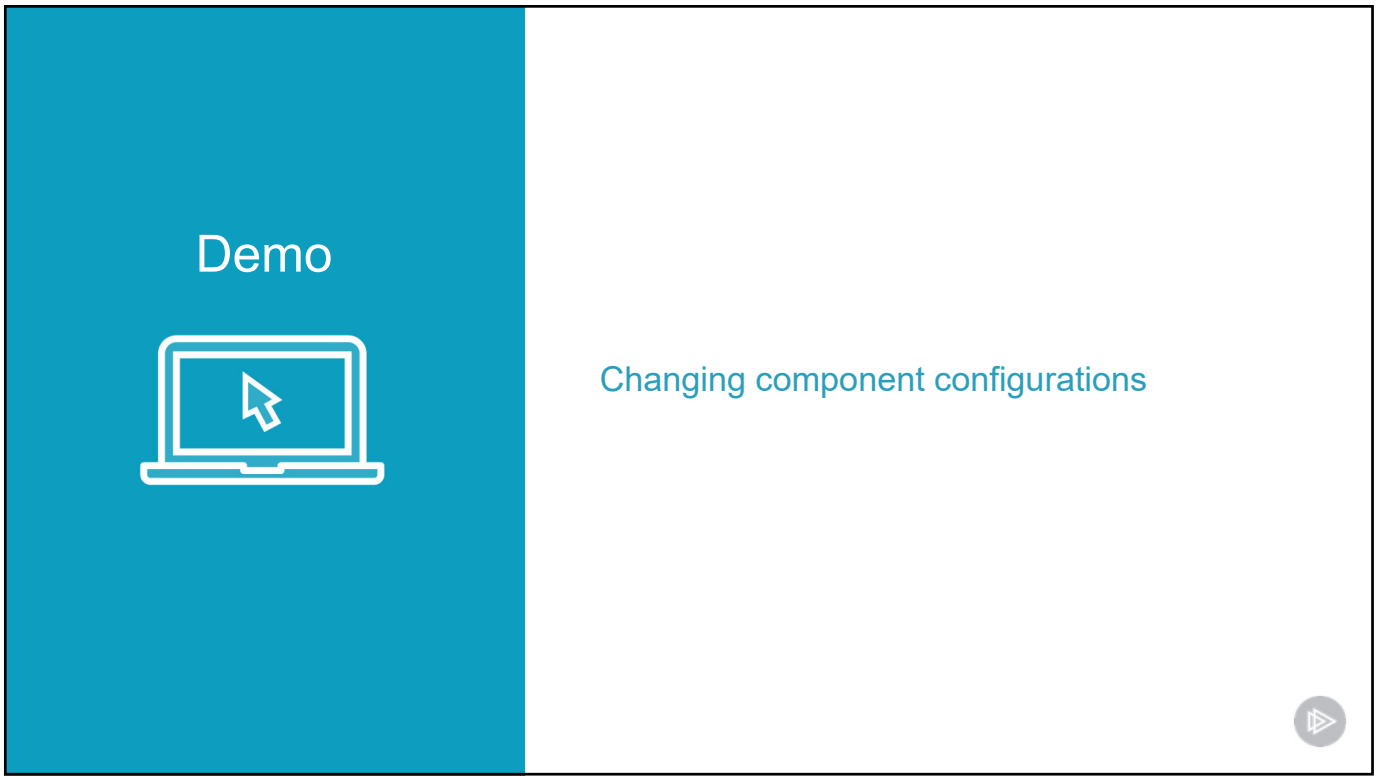
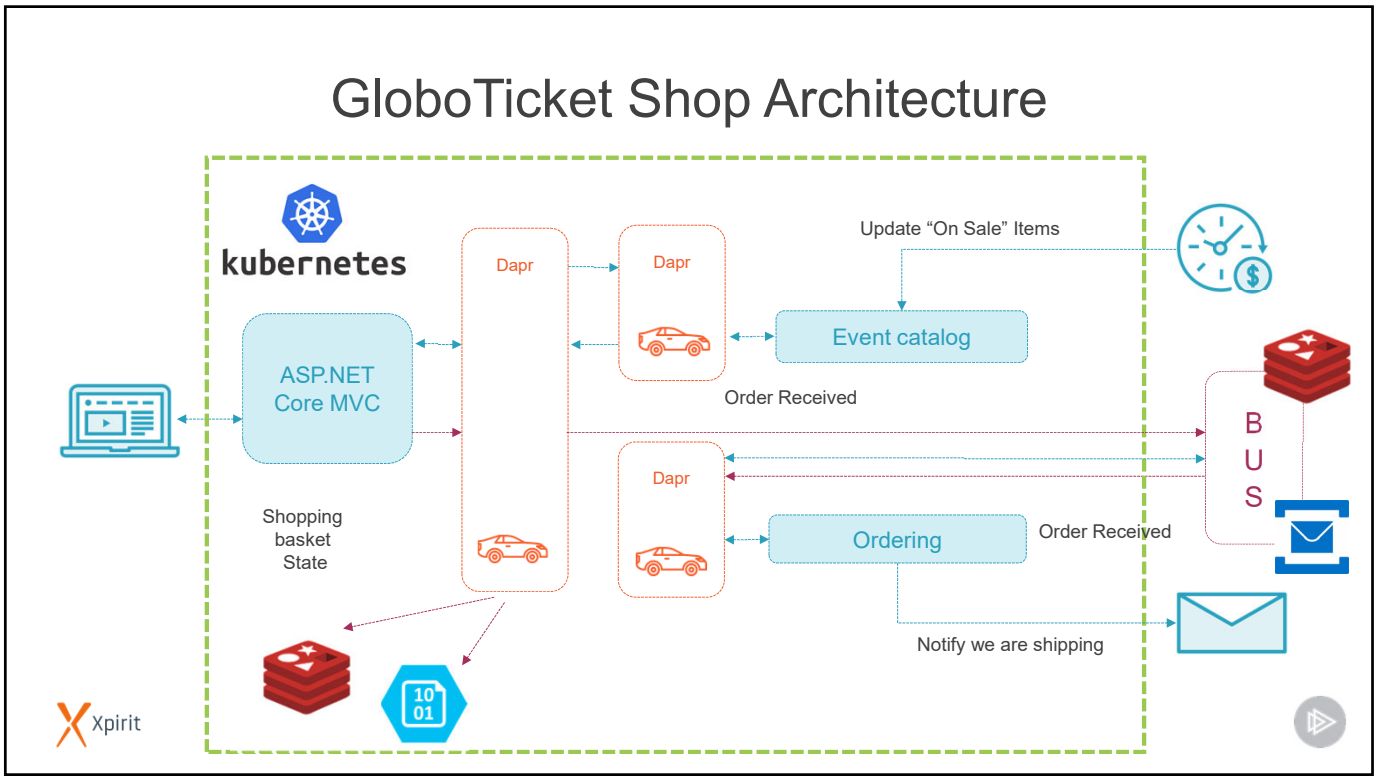
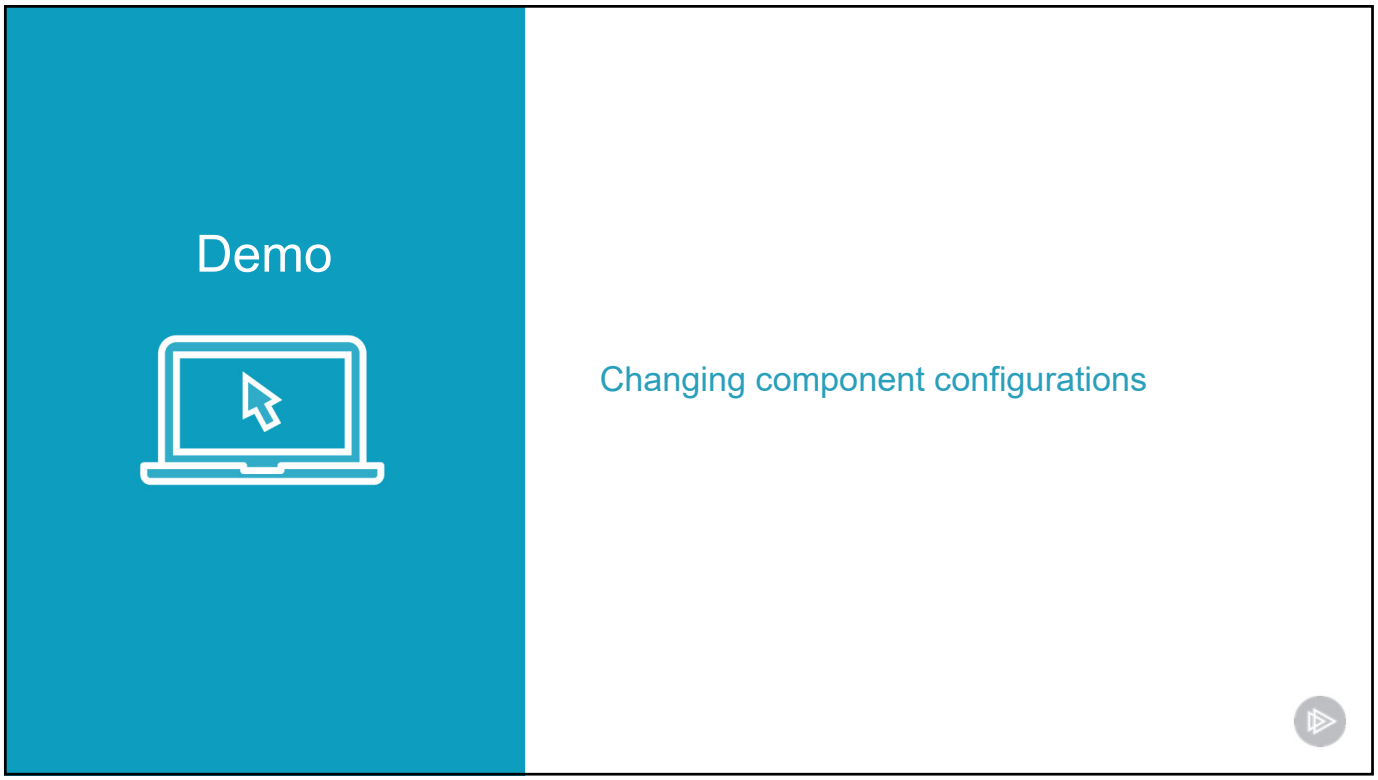
Notify we are shipping
Xpirit


Demo
Changing component configurations

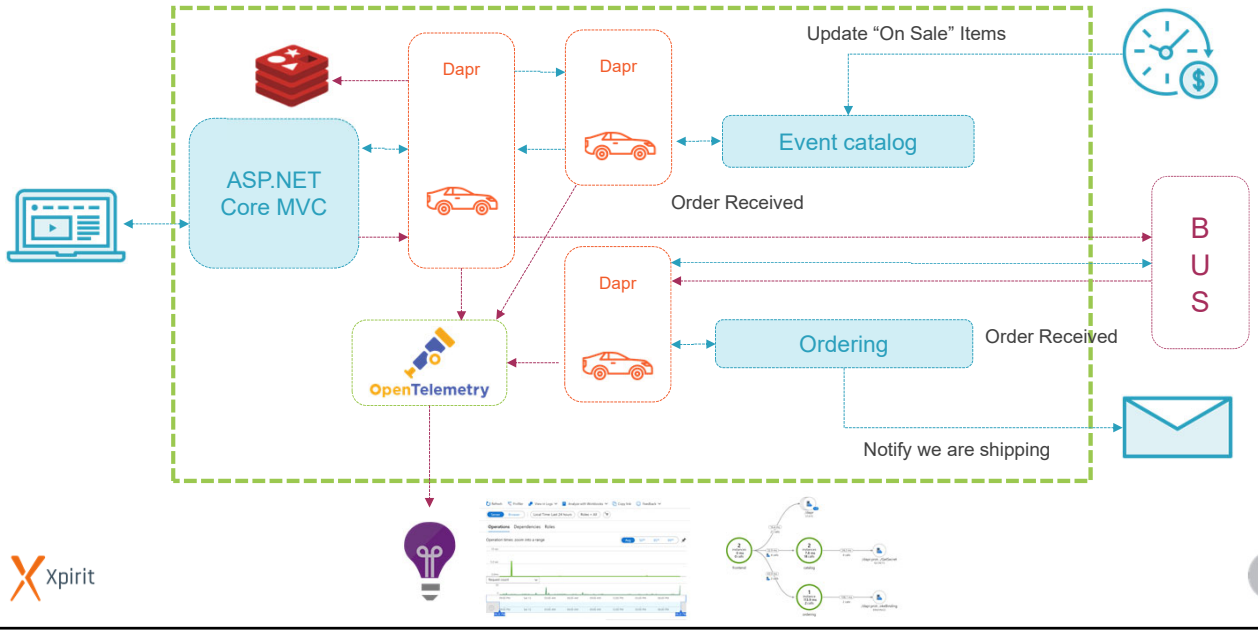

GloboTicket Shop Architecture
kubernetes
Dapr
Dapr
Update "On Sale" Items
Event catalog
ASP.NET Core MVC
Order Received
B U S
Dapr
Shopping basket State
Ordering
Order Received
Notify we are shipping
10 01
Xpirit


Demo
Changing component configurations

Demo

Dapr Observability and Open Telemetry

GloboTicket Shop Architecture



Summary

What problem is solved?

How does DAPR work?

Open telemetry