

Building a Function Pipeline



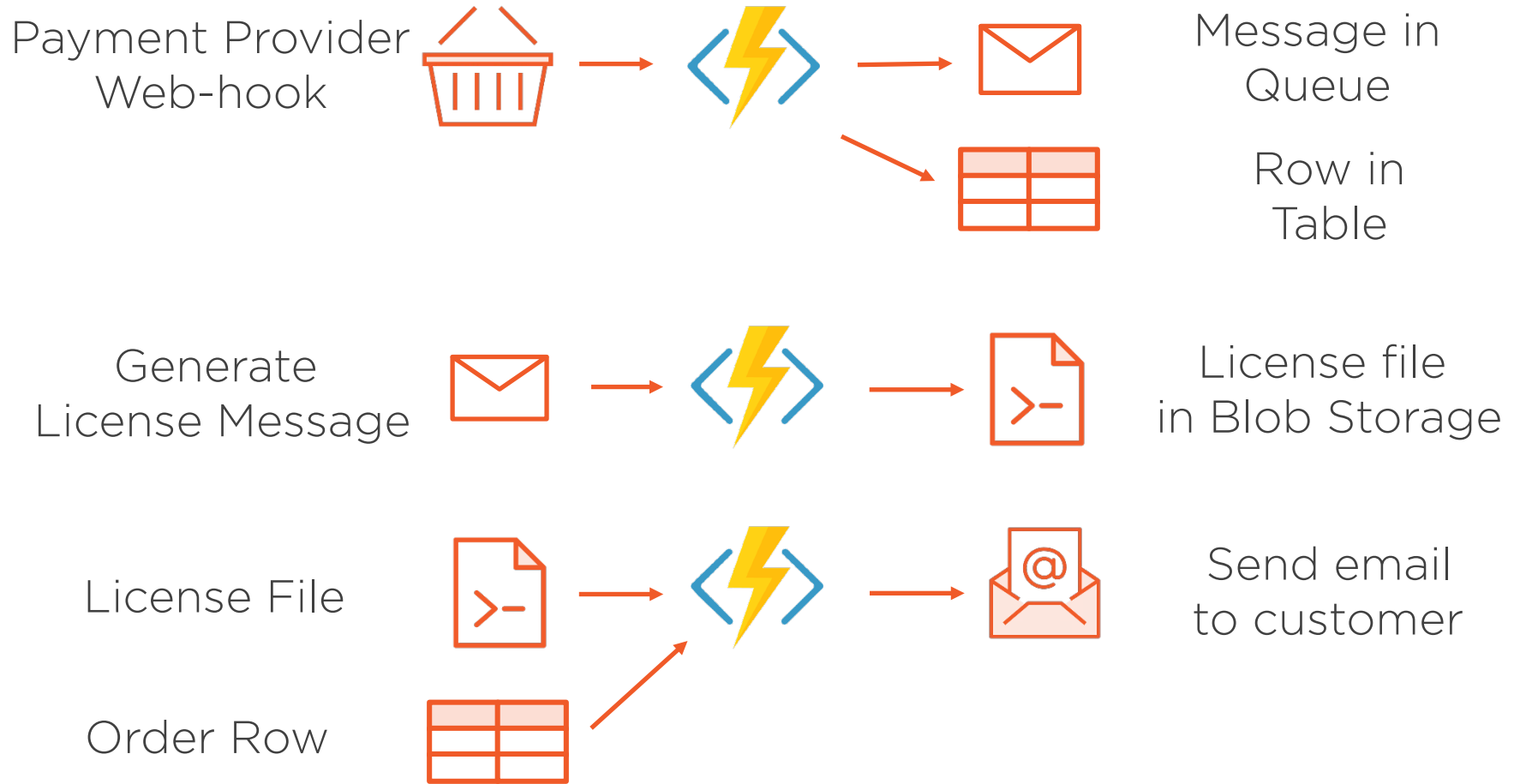
Mark Heath

MICROSOFT AZURE MVP

@mark_heath www.markheath.net



The Story so Far



Overview



More triggers and bindings...

- Queue trigger
- Blob output and trigger
- SendGrid email output
- Table Storage input and output

Advanced binding techniques

- IBinder interface

Function pipelines

- Chain together several, small single-purpose functions

Demo



New Order
Message



License file
in Blob Storage



Demo Recap

New Order
Message



License file
in Blob Storage



Queue Trigger

```
[FunctionName("GenerateLicenseFile")]  
public static async Task Run(  
    [QueueTrigger("orders",  
        Connection="AzureWebJobsStorage")]  
    Order order)  
{ ...
```

UseDevelopmentStorage=true

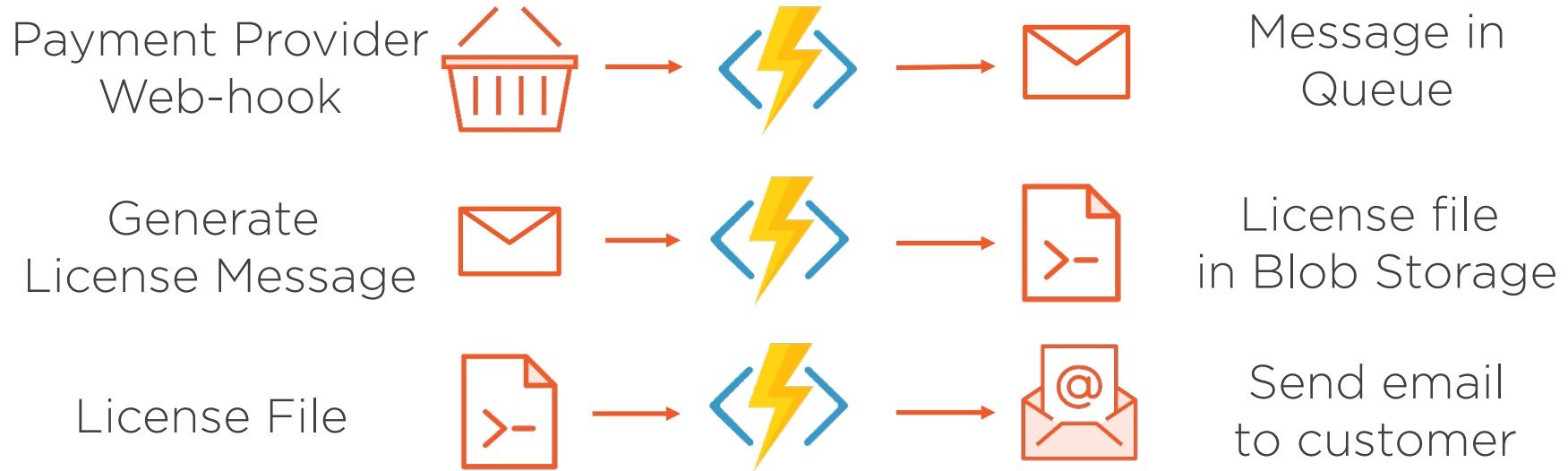


Blob Output Binding

```
[FunctionName("GenerateLicenseFile")]  
public static async Task Run(  
    [QueueTrigger("orders",  
        Connection="AzureWebJobsStorage")]  
    Order order,  
    [Blob("licenses/{rand-guid}.lic")]  
    TextWriter outputBlob)  
{ ...
```



The Story so Far



Demo



License File



Send email
to customer



Demo Recap

License file



Send email
to customer



Blob Trigger

```
[FunctionName("EmailLicenseFile")]  
public static void Run(  
    [BlobTrigger("licenses/{orderId}.lic",  
        Connection="AzureWebJobsStorage")]  
    string licenseFileContents,  
    string orderId)  
{ ...
```



Blob Trigger Bindings



Binding to parameters

- String
- Custom object
- Stream
- CloudBlockBlob
- ... many others

SendGrid Output Binding

```
[FunctionName("EmailLicenseFile")]  
public static void Run(  
    [BlobTrigger("licenses/{orderId}.lic",  
        Connection="AzureWebJobsStorage")]  
    string licenseFileContents,  
    [SendGrid(ApiKey="SendGridApiKey")]  
    out SendGridMessage message)  
{ ...
```



What if Bindings Don't Meet My Needs?

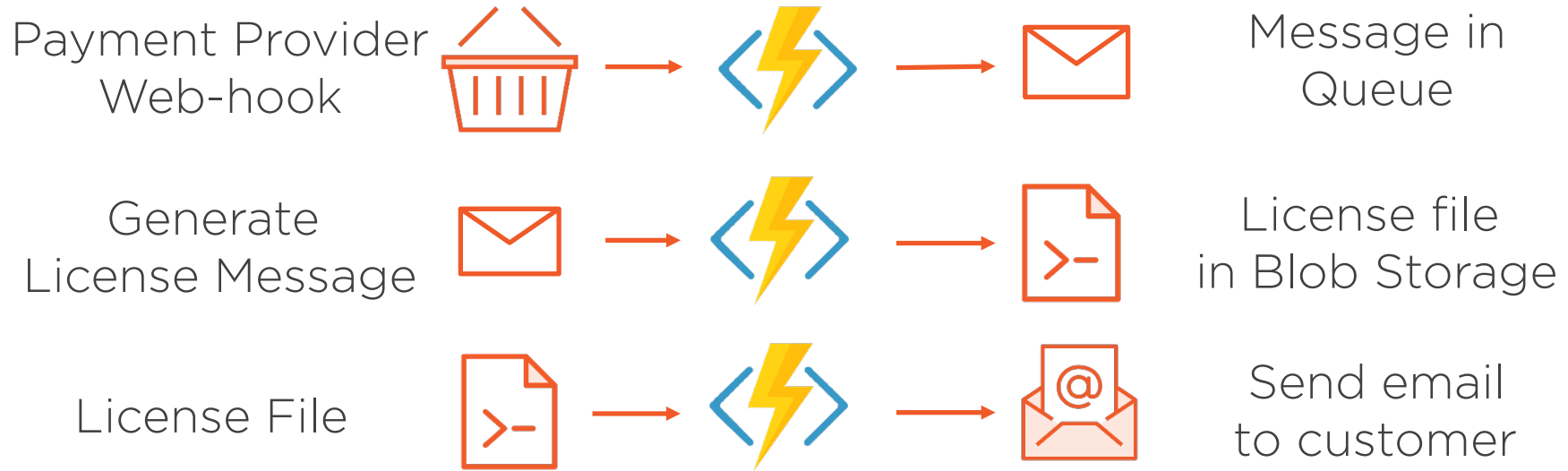


You don't have to use bindings

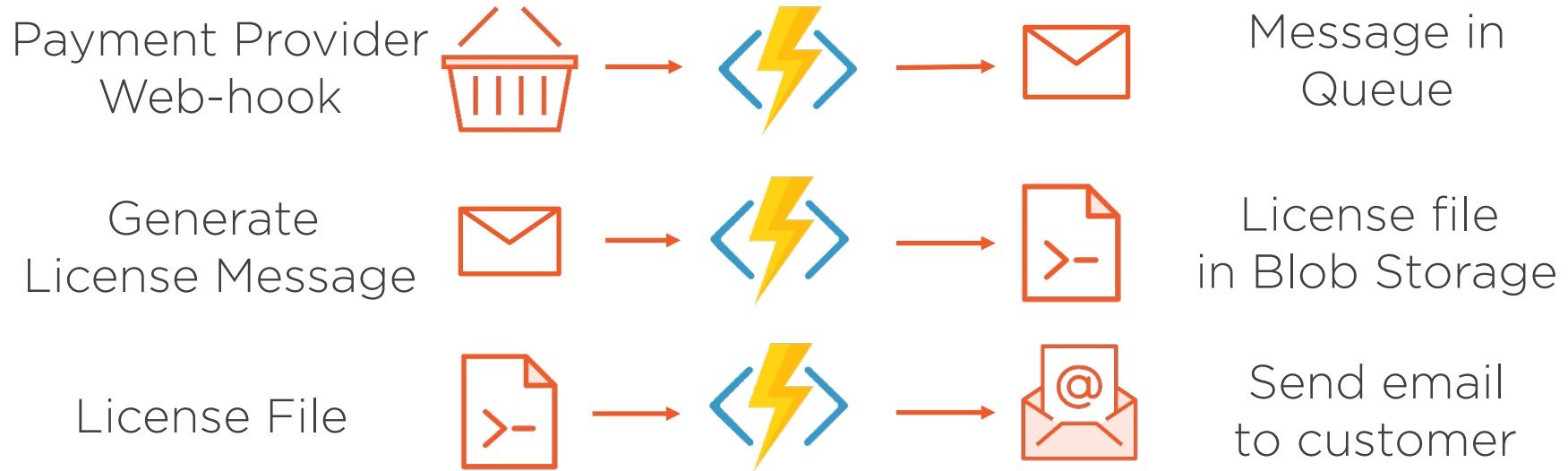
Bindings are provided for convenience



The Story so Far



The Story so Far



Database Bindings



Output bindings

- Azure Cosmos DB
- Azure Table Storage

Azure SQL Database

- No built-in support yet
- Use your own EF models

Demo



Payment Provider
Web-hook



Message in
Queue

Row in
Table



Demo Recap

Payment Provider
Web-hook



Message in
Queue
Row in
Table

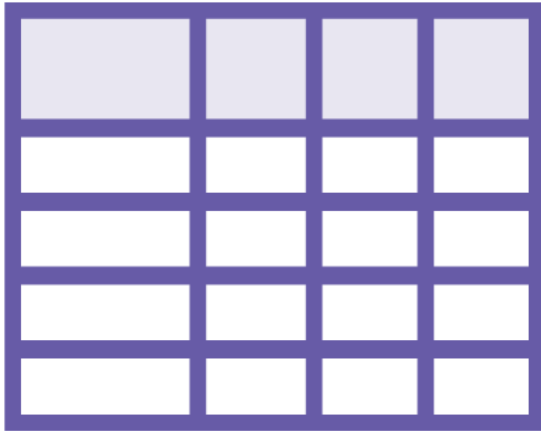


Table Storage Output Binding

```
[FunctionName("OnPaymentReceived")]  
public static async Task<IActionResult> Run(  
    [HttpTrigger(AuthorizationLevel.Function,  
        "post", Route = null)] HttpRequest req,  
    [Queue("orders")] IAsyncCollector<Order> orderQueue,  
    [Table("orders")] IAsyncCollector<Order> orderTable)  
{ ...
```



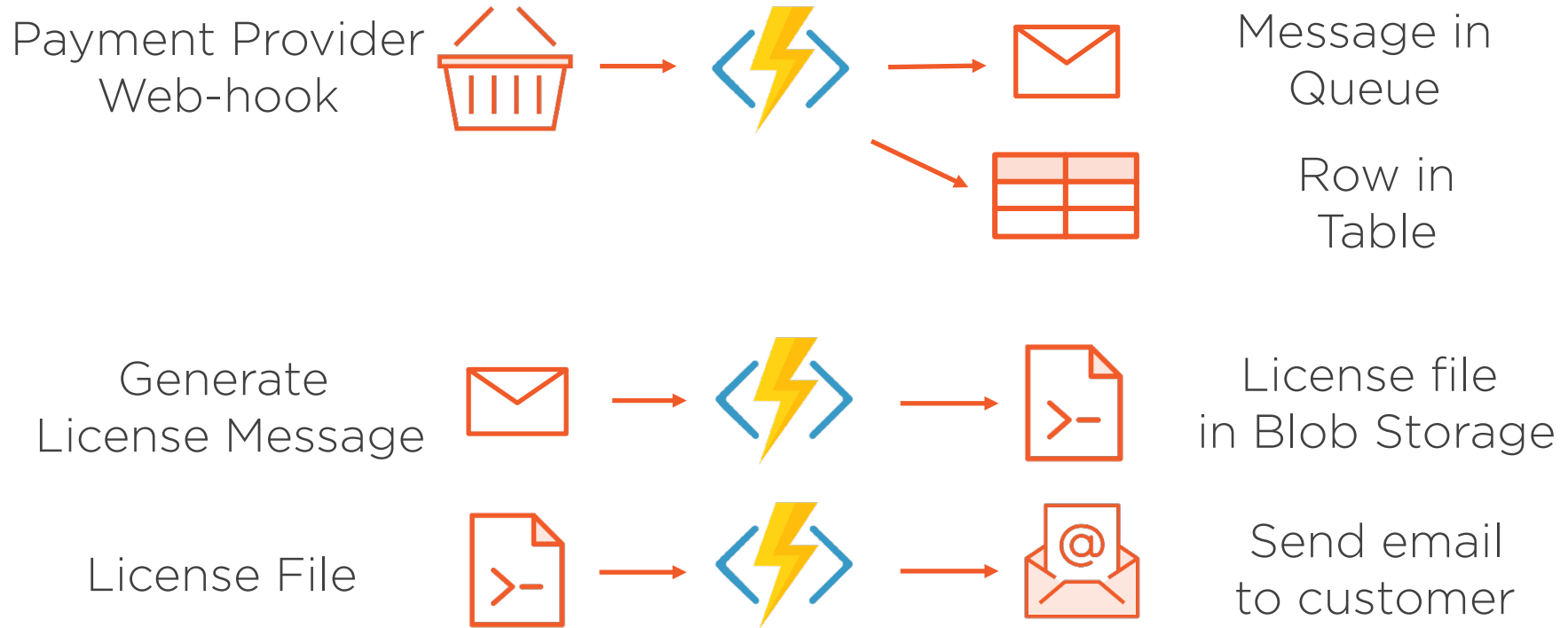
Table Storage Output Binding



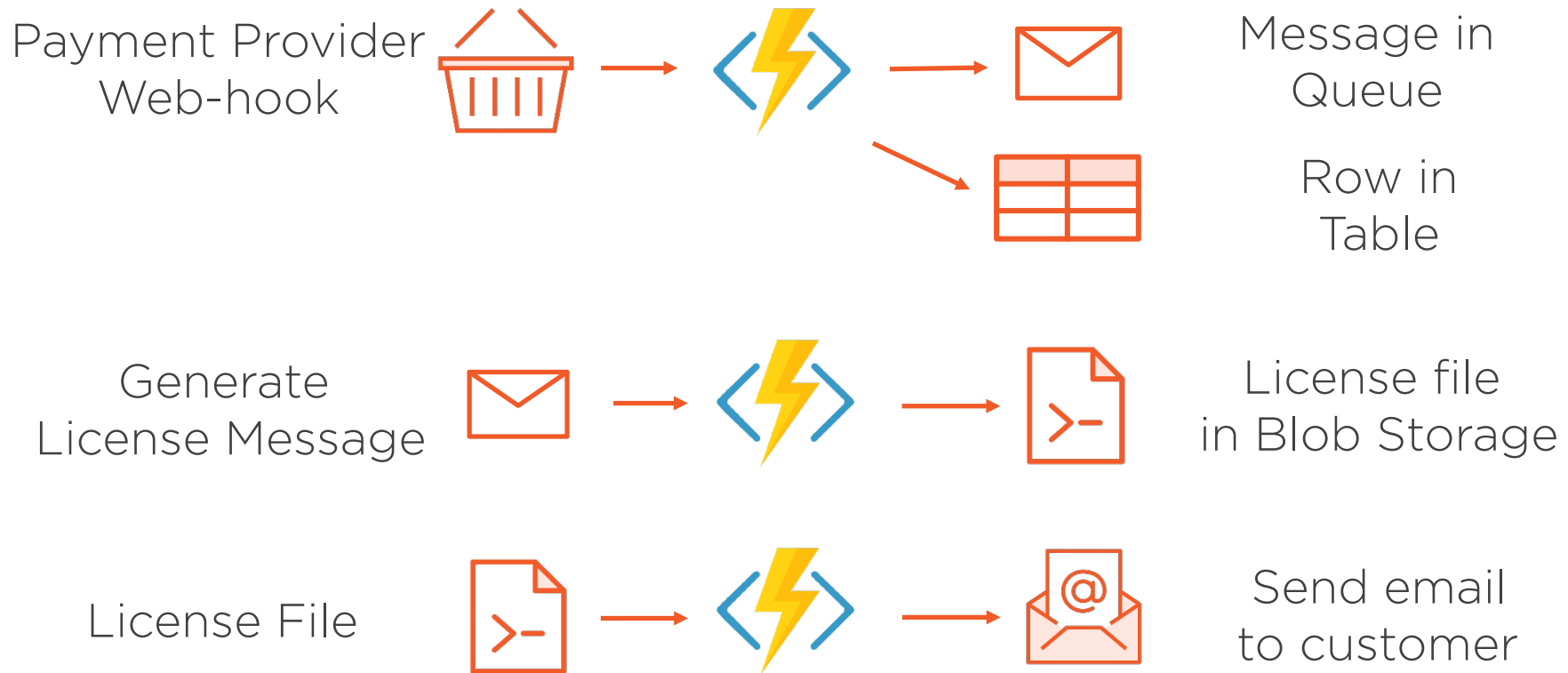
IAsyncCollector<T>

- Strongly typed object
- RowKey and PartitionKey

The Story so Far



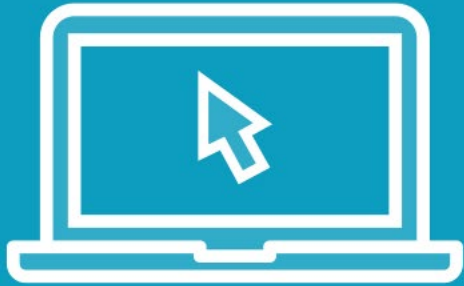
The Story so Far



a9298135-4c7f-4829-a441-e3a5f7c8a4c4.lic



Demo



IBinder

- Control license filename

Input binding

- Lookup order in Azure Table Storage

Optional email sending

- `ICollector<T>`



IBinder Interface

Customize any binding at runtime

```
var outputBlob = await binder.BindAsync<TextWriter>(
    new BlobAttribute($"licenses/{order.OrderId}.lic")
    { Connection = "AzureWebJobsStorage" });
```

Works with all binding attributes (e.g. QueueAttribute, SendGridAttribute)

Calculate attribute parameters on-demand in the function body

Flexibility to choose the type to bind to at runtime



Demo Recap



```
[FunctionName("GenerateLicenseFile")]  
public static async Task Run(  
    [QueueTrigger("orders")] Order order,  
    IBinder binder)  
{  
    var outputBlob = await binder.BindAsync<TextWriter>(  
        new BlobAttribute($"licenses/{order.OrderId}.lic")  
        { Connection = "AzureWebJobsStorage" });
```

IBinder

Control blob filenames

Make decisions about binding properties in the function body



Table Storage Input Binding

```
[FunctionName("EmailLicenseFile")]  
public static void Run(  
    [BlobTrigger("licenses/{orderId}.lic")]  
    string licenseFileContents,  
    [Table("orders", "orders", "{orderId}")]  
    Order order,  
    string orderId)
```

TableAttribute(tableName, partitionKey, rowKey)

```
var row = await binder.BindAsync<Order>(  
    new TableAttribute(tableName, partitionKey, rowKey);
```

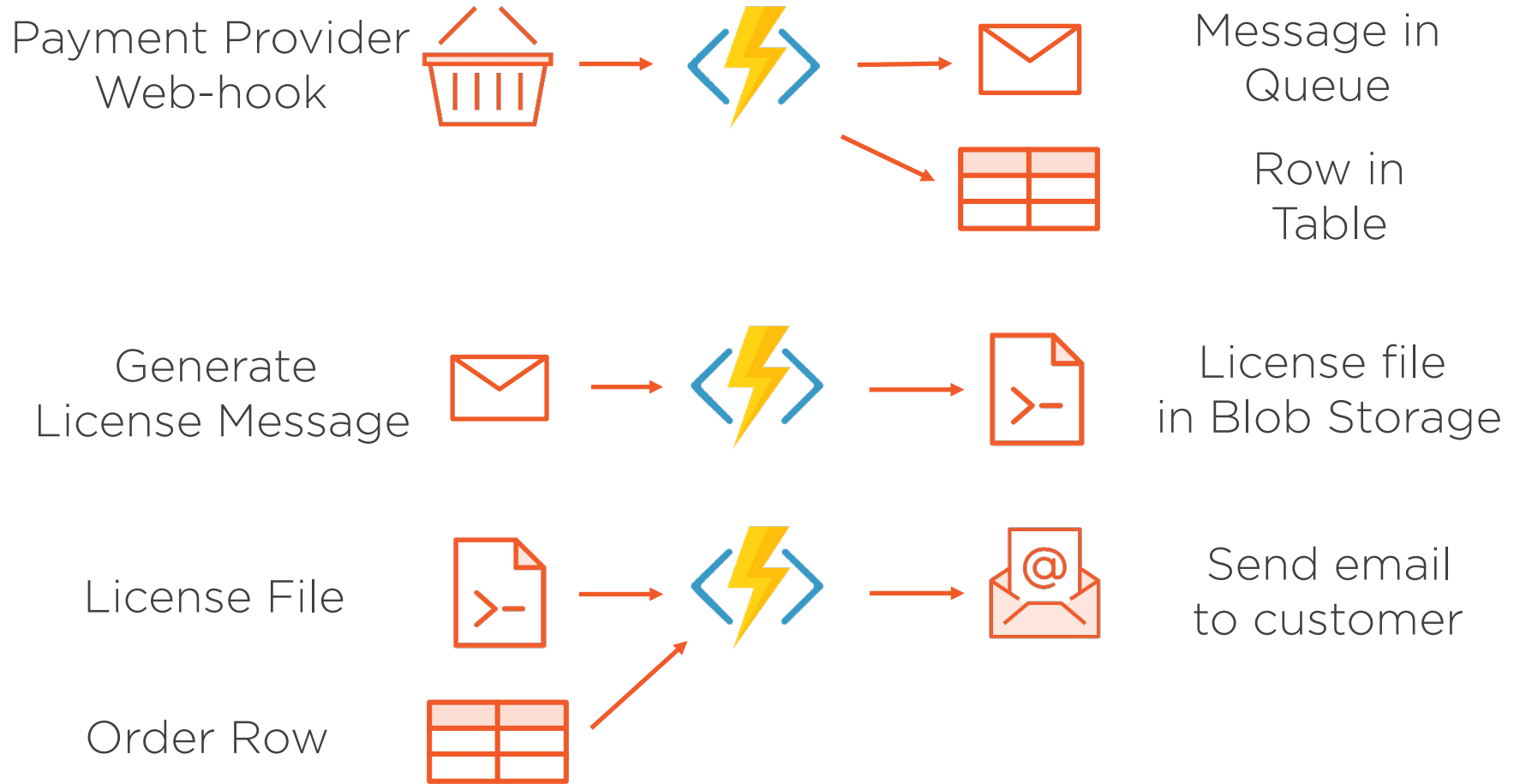


Optional Email Sending

```
[FunctionName("EmailLicenseFile")]
public static void Run(
    [BlobTrigger("licenses/{orderId}.lic",
        Connection="AzureWebJobsStorage")]
    string licenseFileContents,
    [SendGrid(ApiKey="SendGridApiKey")]
    ICollection<SendGridMessage> sender)
{
    ...
    if (!email.EndsWith("@test.com"))
        sender.Add(message);
}
```

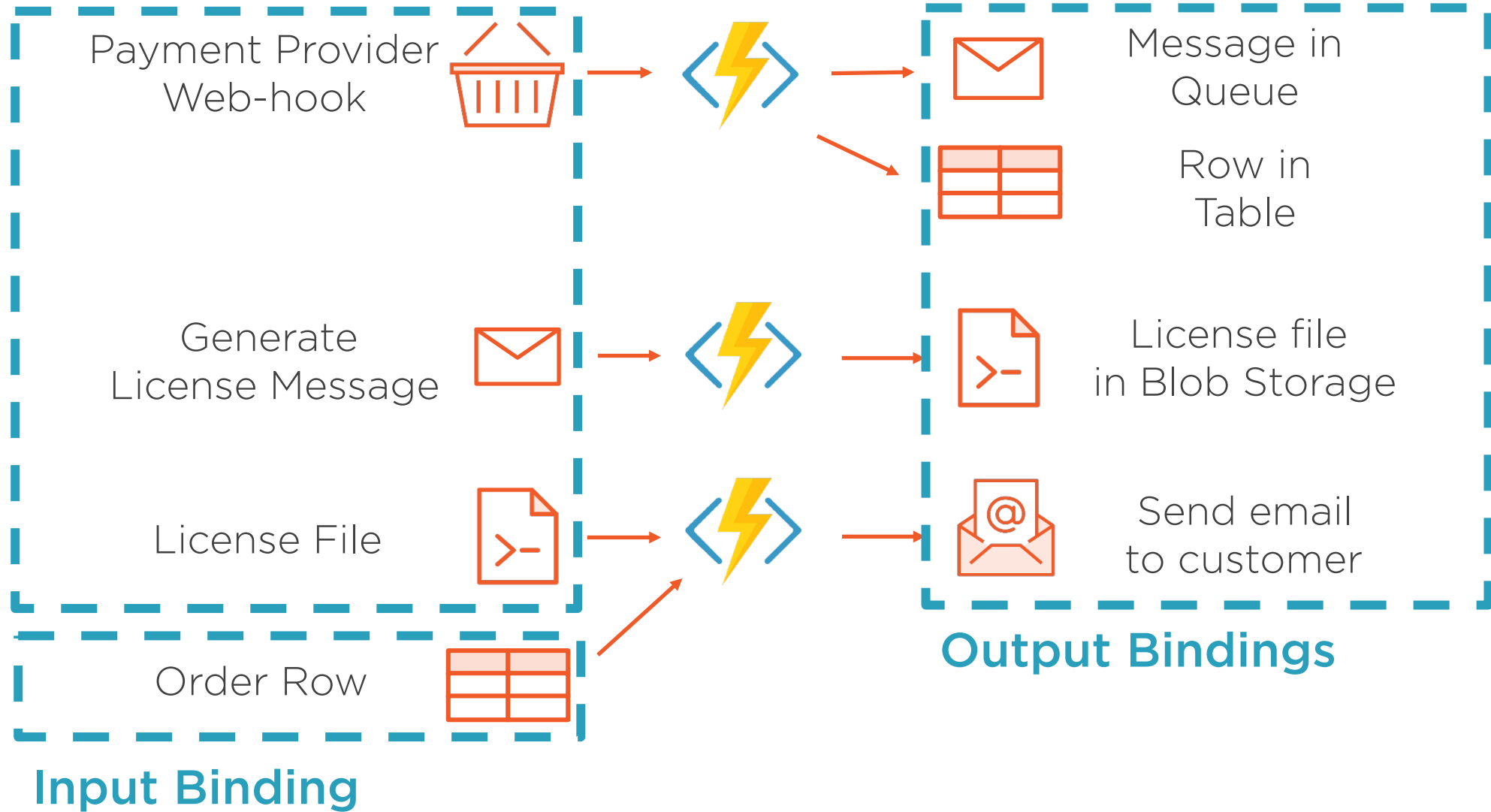


The Story so Far



The Story so Far

Triggers



That's Not All



More triggers and bindings

- Service Bus, Cosmos DB, Twilio

More parameter types

- Read the docs!

More languages

- JavaScript, F#, Java
- Learn from the sample templates

Next Up...

Deploying Azure Functions

