Session

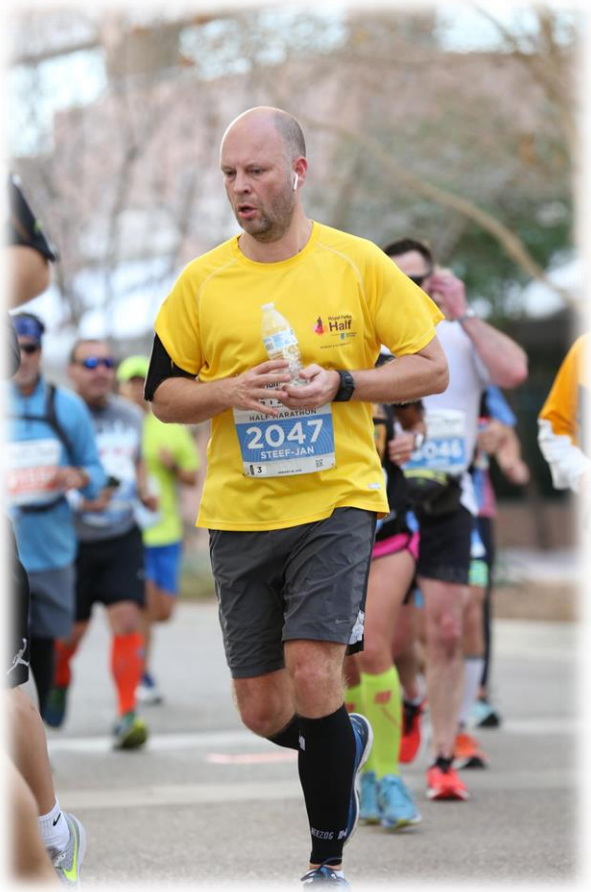
The way of the exploding workflow

Steef-Jan Wiggers

Azure Technology Consultant

intelligent
cloud conference

Who am I?



codit Azure Technology Consultant

Microsoft MVP – Azure

InfoQ Cloud Editor

WAZUG board member

Azure Lowlands Organizer

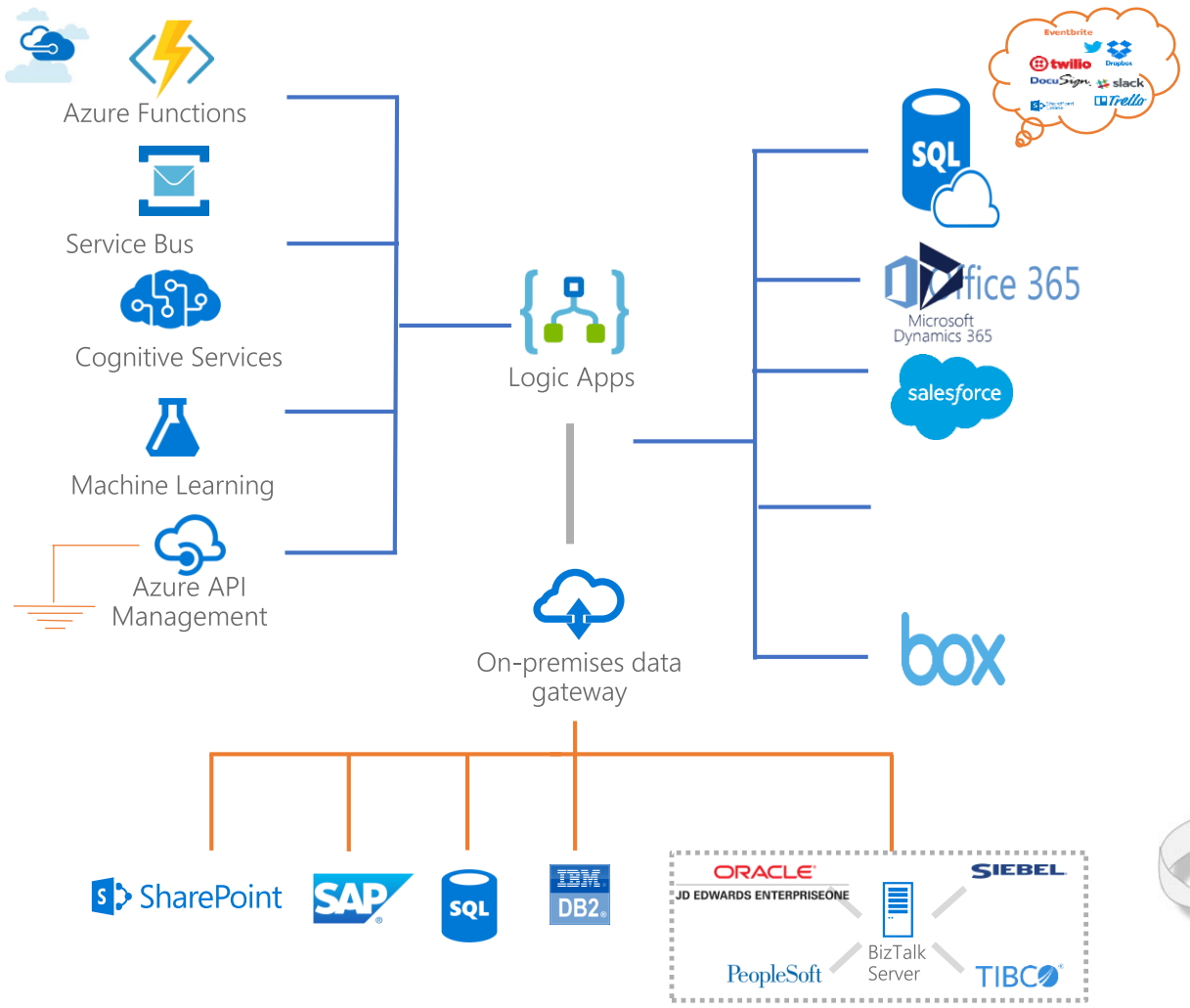
Way of the exploding fist

iPaaS - Market

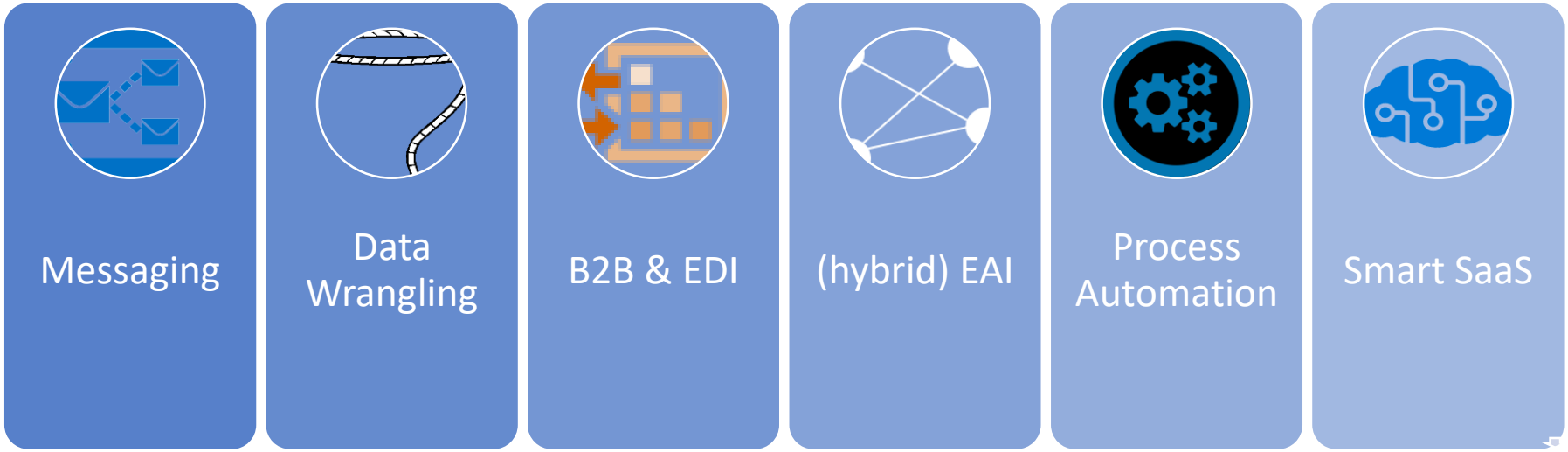
- Solving the business problem first
- Fit for purpose for cloud integration
- Less cost, fast time to market

What are Logic Apps?

- Connect to on-premises, hybrid, and cloud applications
- Run mission critical, complex integration scenarios with ease
- Build smart integrations leveraging machine learning, cognitive services



The service supports various scenario’s



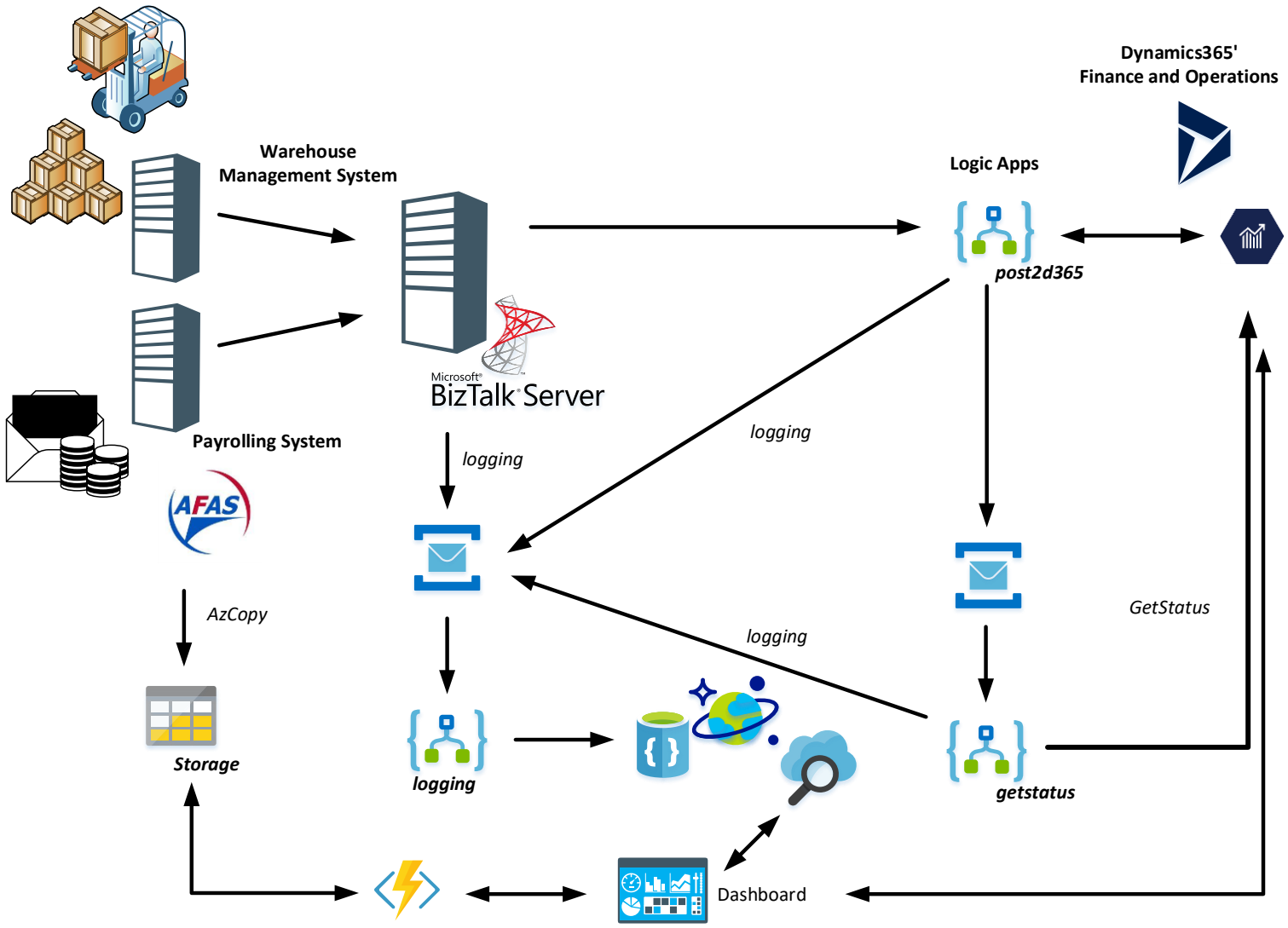
Serverless

Event-driven scale

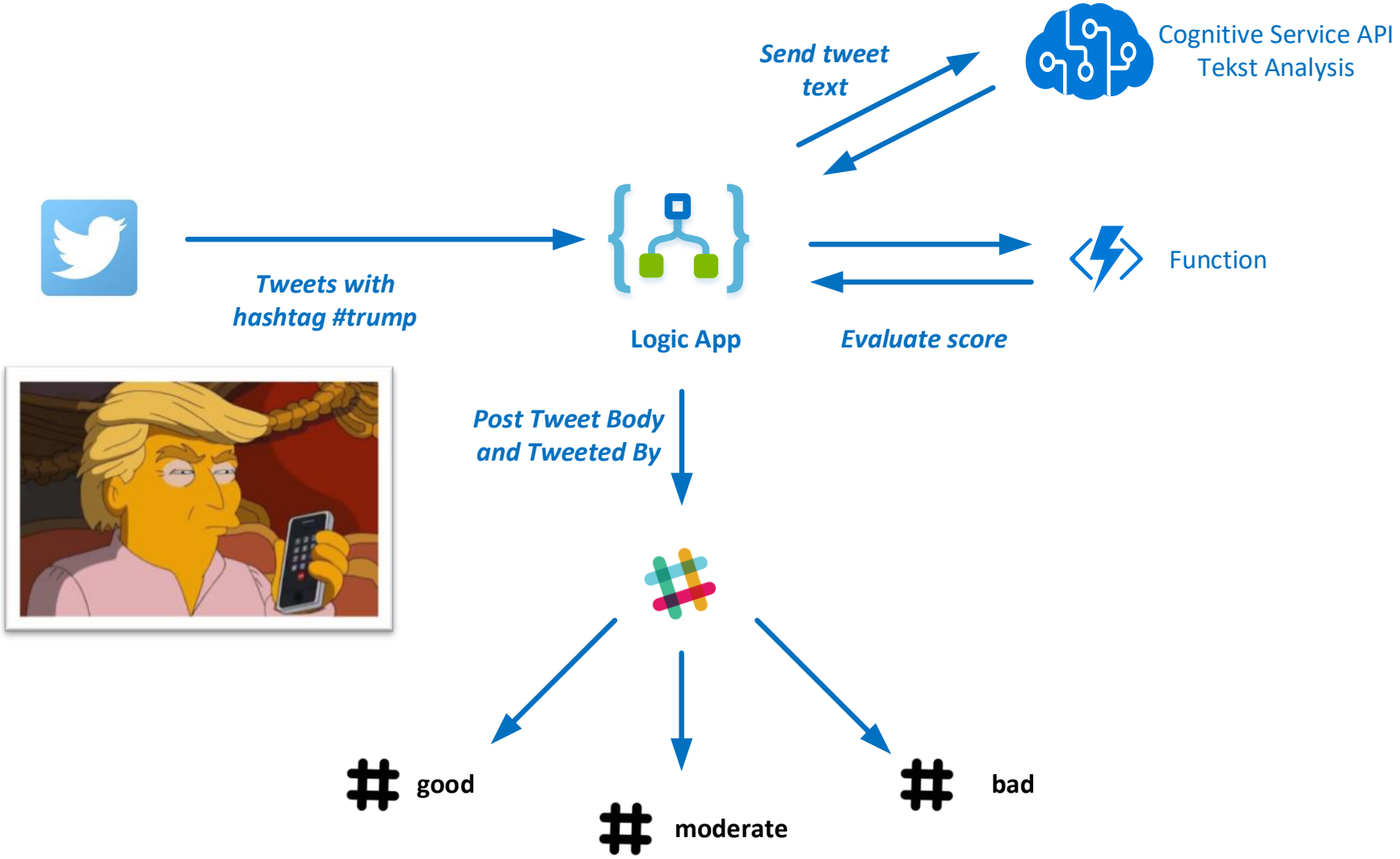
Abstraction of servers

Micro-billing

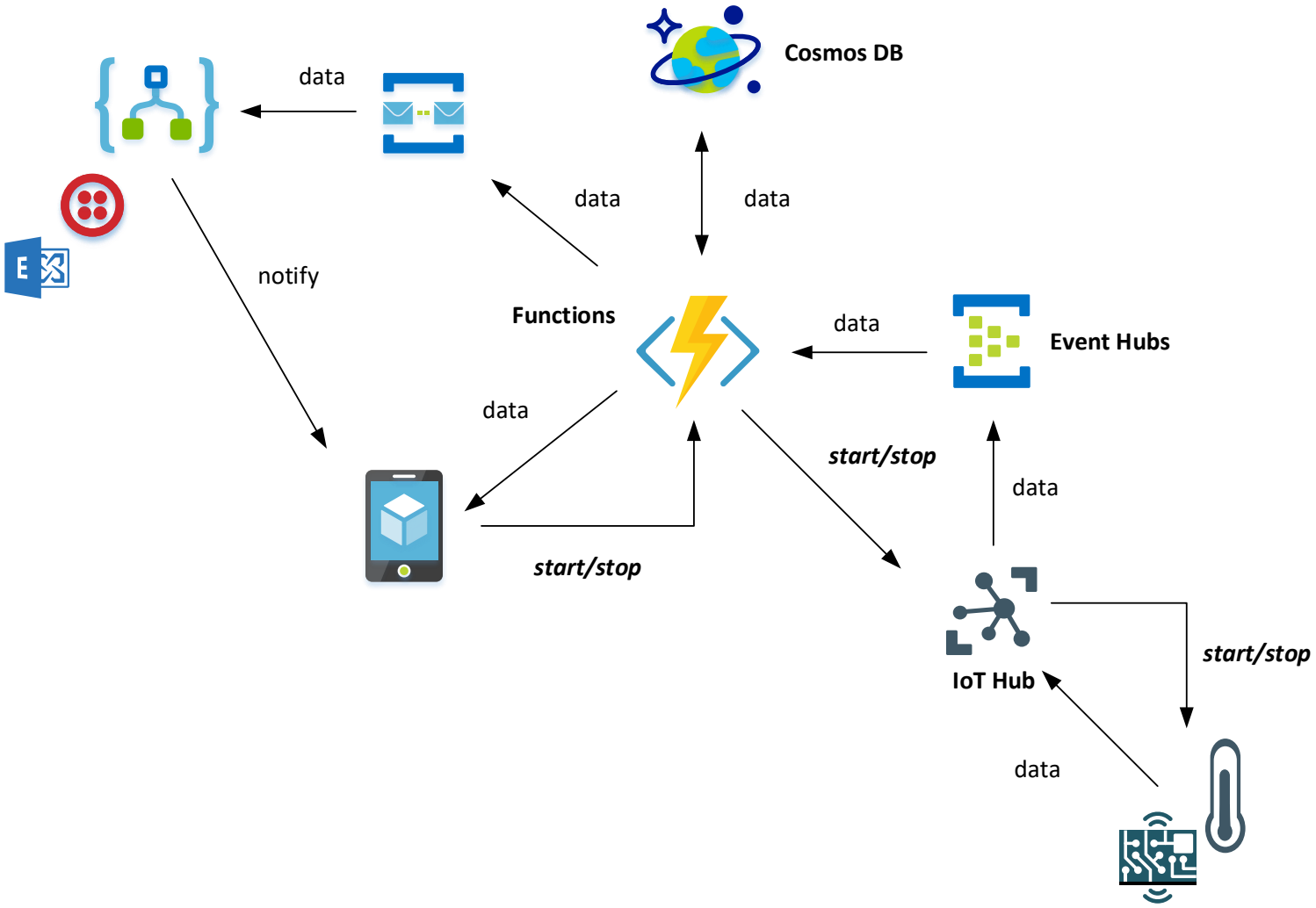
Scenario - EAI



Scenario – Smart SaaS



Demo – Messaging (Send Notification)



Connectors

Cloud APIs and platform functionality

- Over 200 out of box connectors
  - SaaS, on-prem, protocols, B2B and message manipulation
- Hybrid connectivity
- Hosted and managed within the platform
- Scales to meet your needs
- First class designer experience

Custom Connectors

- Access any REST/SOAP API
- Cloud or on-premises
- Simple creation wizard
- Connections and managed secrets
- First class designer experience

API connections

- Authenticate once and reuse
- Differentiate connection configuration
- Simple to deploy
- Portal experience for managing API Connections

Triggers

Creates new instances of Logic Apps

- Recurrence/advanced scheduling
- Polling
- Webhook
- Request

Actions

Invoke services

- Managed Connectors
- App Service APIs
- API Management
- Azure Functions
- Workflow
- HTTP + Swagger
- HTTP

Control behaviour

- Retry Policy
- Run After
- Limit
- Response
- Webhook
- Batch
- Wait
- Terminate

Message Handling

- Compose
- Query
- Table
- Request schema
- Parse JSON
- Xpath
- XSLT
- XML validation
- Expression conversion

Flow Control

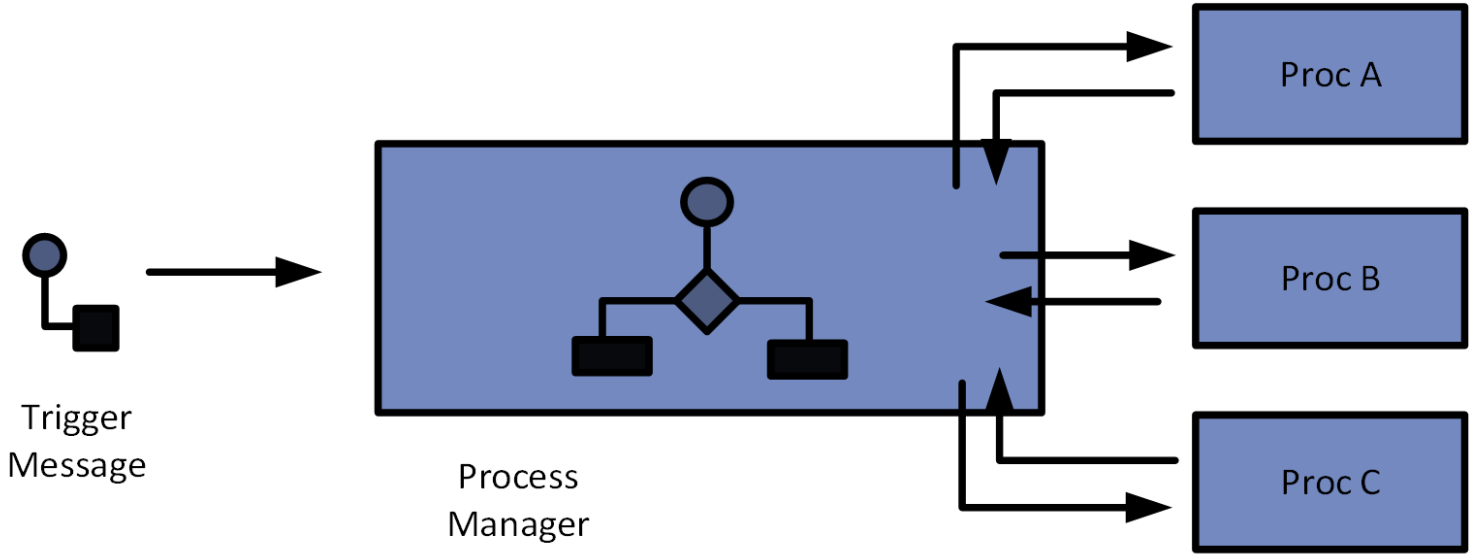
- Scope
- Condition
- Switch Case
- For Each
- Until

Patterns

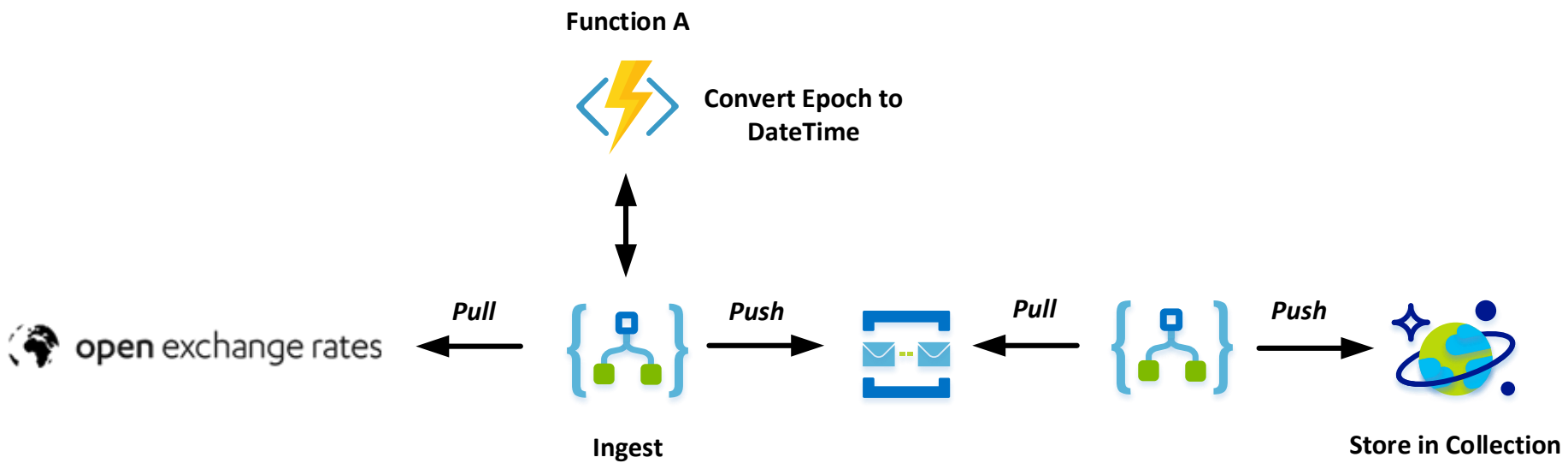
- Various patterns possible ranging from request-reply to process manager

Process Manager

Central processing unit, determine steps based on intermediate result

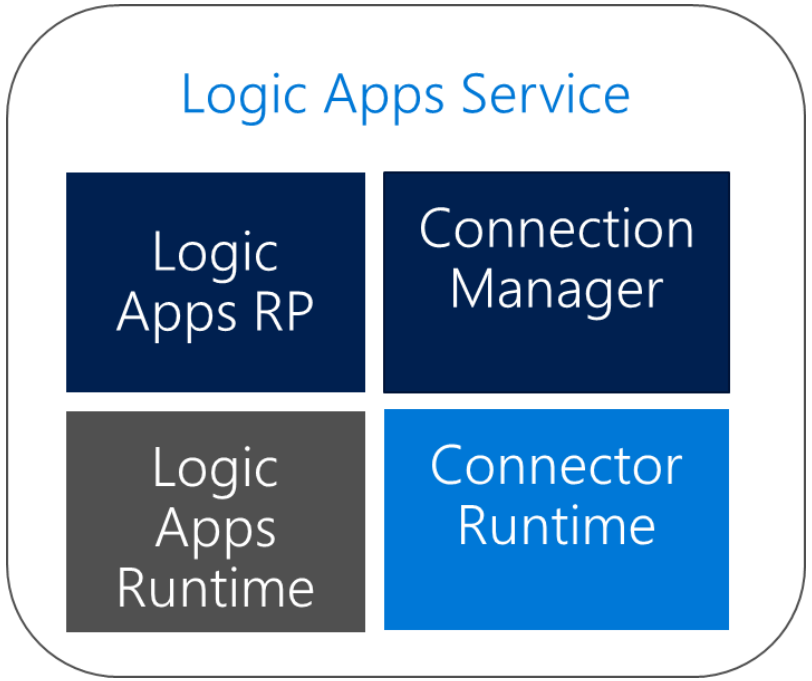


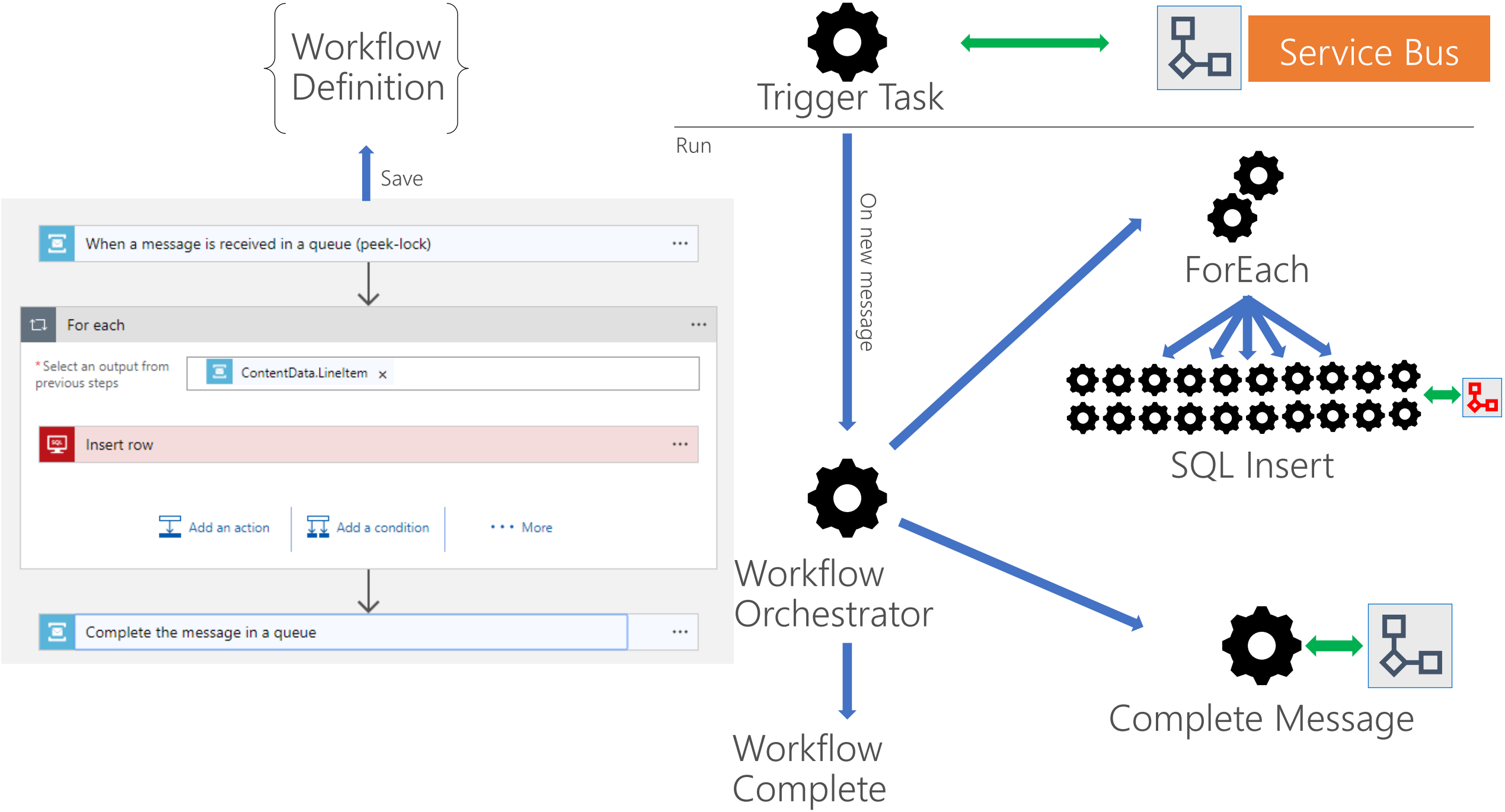
Demo – Process Manager



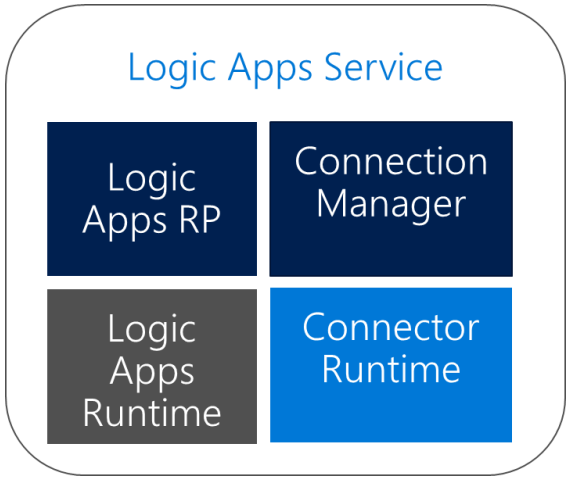
Runtime - Logic App Workflow Engine

- Logic Apps is a job scheduler with a JSON-based DSL describing a dependency graph of actions
- Highly parallelized concurrent job execution engine




Workflow Definition
Save
When a message is received in a queue (peek-lock)
For each
* Select an output from previous steps
ContentData.LineItem
Insert row
Add an action
Add a condition
More
Complete the message in a queue
Trigger Task
Service Bus
Run
On new message
ForEach
SQL Insert
Workflow Orchestrator
Complete Message
Workflow Complete

Component Architecture



- **Logic Apps RP**

  Reads the workflow definition and breaks down into a composition of tasks with dependencies

- **Logic Apps Runtime**

  Distributed compute/workers are coordinated to complete tasks on-demand

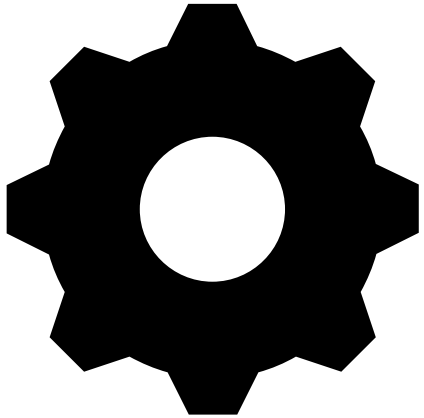
- **Connection Manager**

  Manages connection configuration, credentials and token refreshment

- **Connector Runtime**

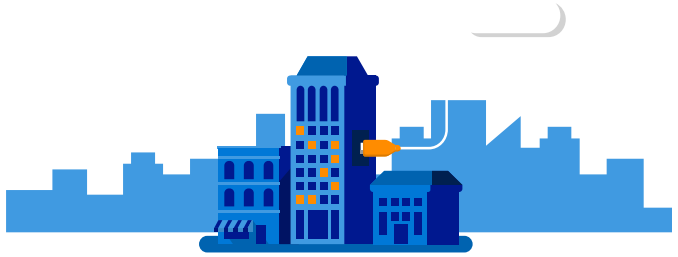
  API abstraction via Open API descriptions

Task Resiliency



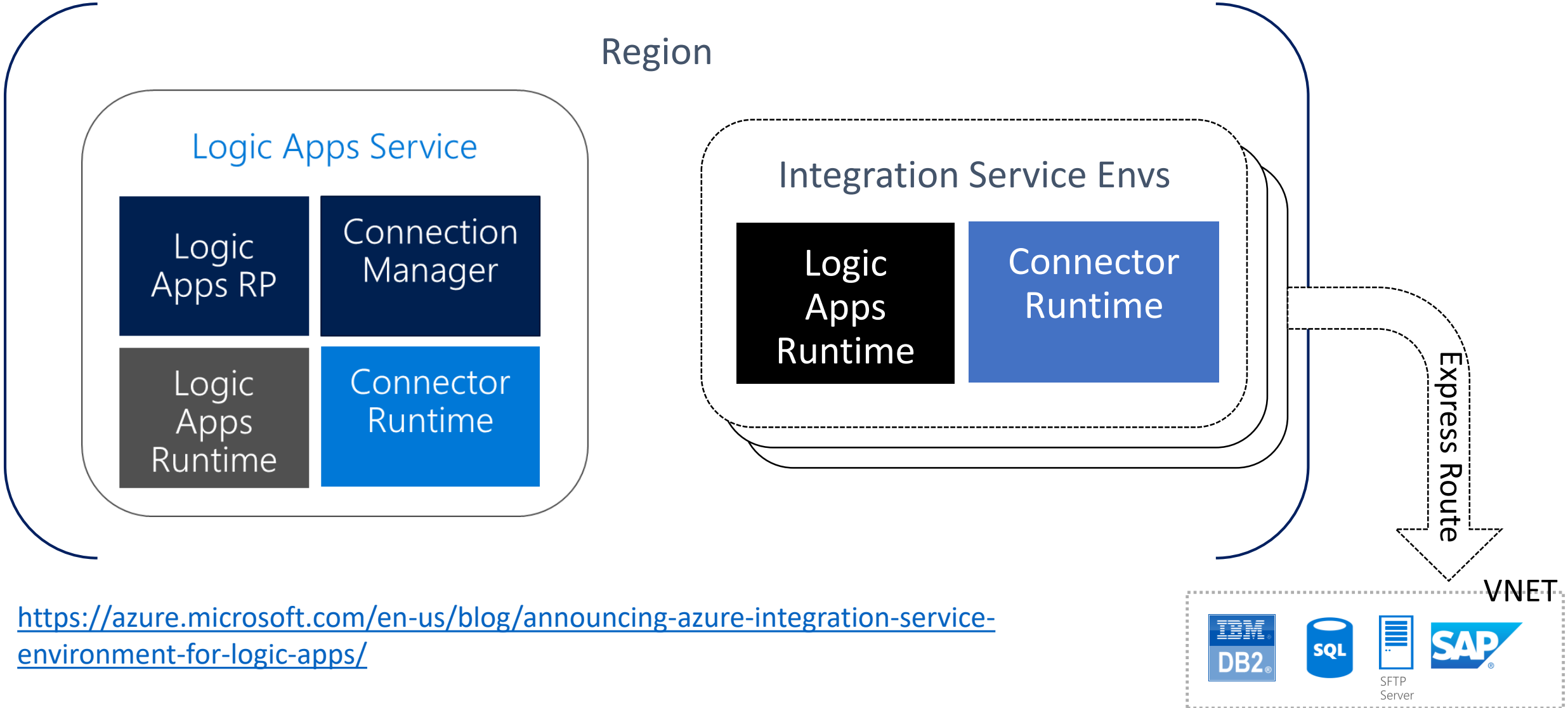
- No active thread management – tasks and runs can exist in parallel and at massive scale
- At least once guaranteed execution
- Transient failures invoke retry-policies (DNS issues, throttles, or 5xx responses)
- If the task doesn’t respond, workflow orchestrator will assign a new task (at least once guarantee)

Integration Service Environments (ISE)



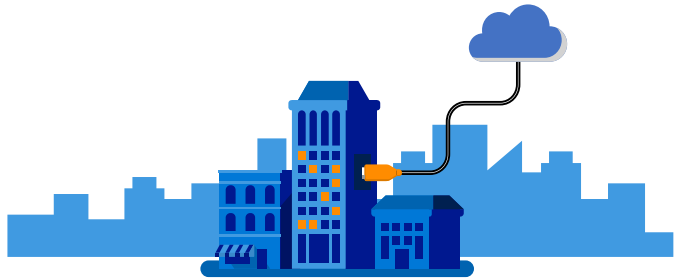
- VNET connectivity
- Private static outbound IPs
- Custom inbound domain names
- Dedicated compute
- Isolated storage
- Flat cost

ISE Architecture



https://azure.microsoft.com/en-us/blog/announcing-azure-integration-service-environment-for-logic-apps/

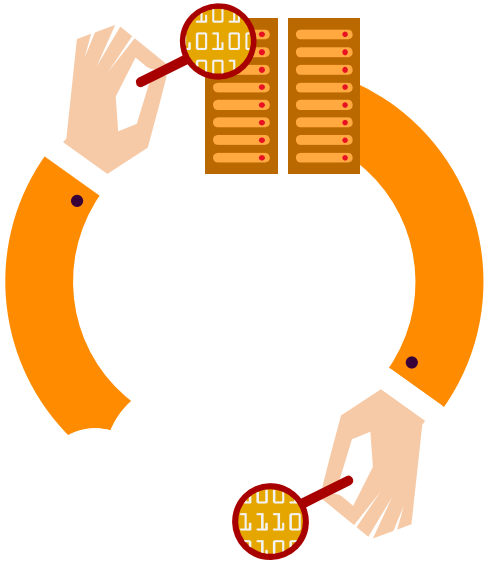
Deployment model



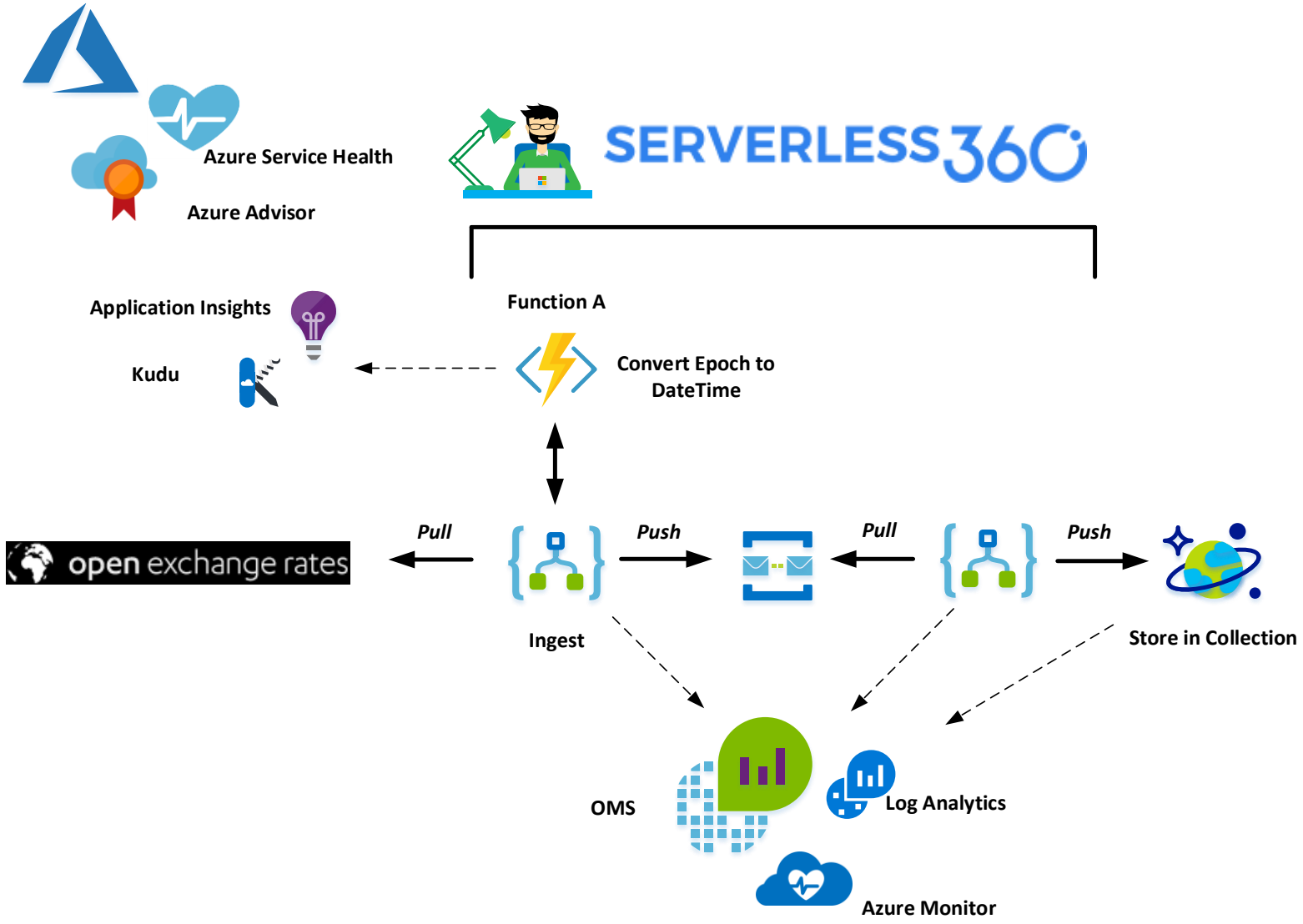
- Base Unit:
  - 75 M action executions / month
  - 1 standard integration account
  - 1 enterprise connector
    - Includes unlimited connections
  - VNET connectivity
- Each additional processing unit:
  - Additional 50M executions / month

Monitoring

- Trigger and run history
- Monitoring View
- Diagnostics
- Alerts
- Tracked Properties
- Tracking API
- Operation Management



Demo - Monitoring



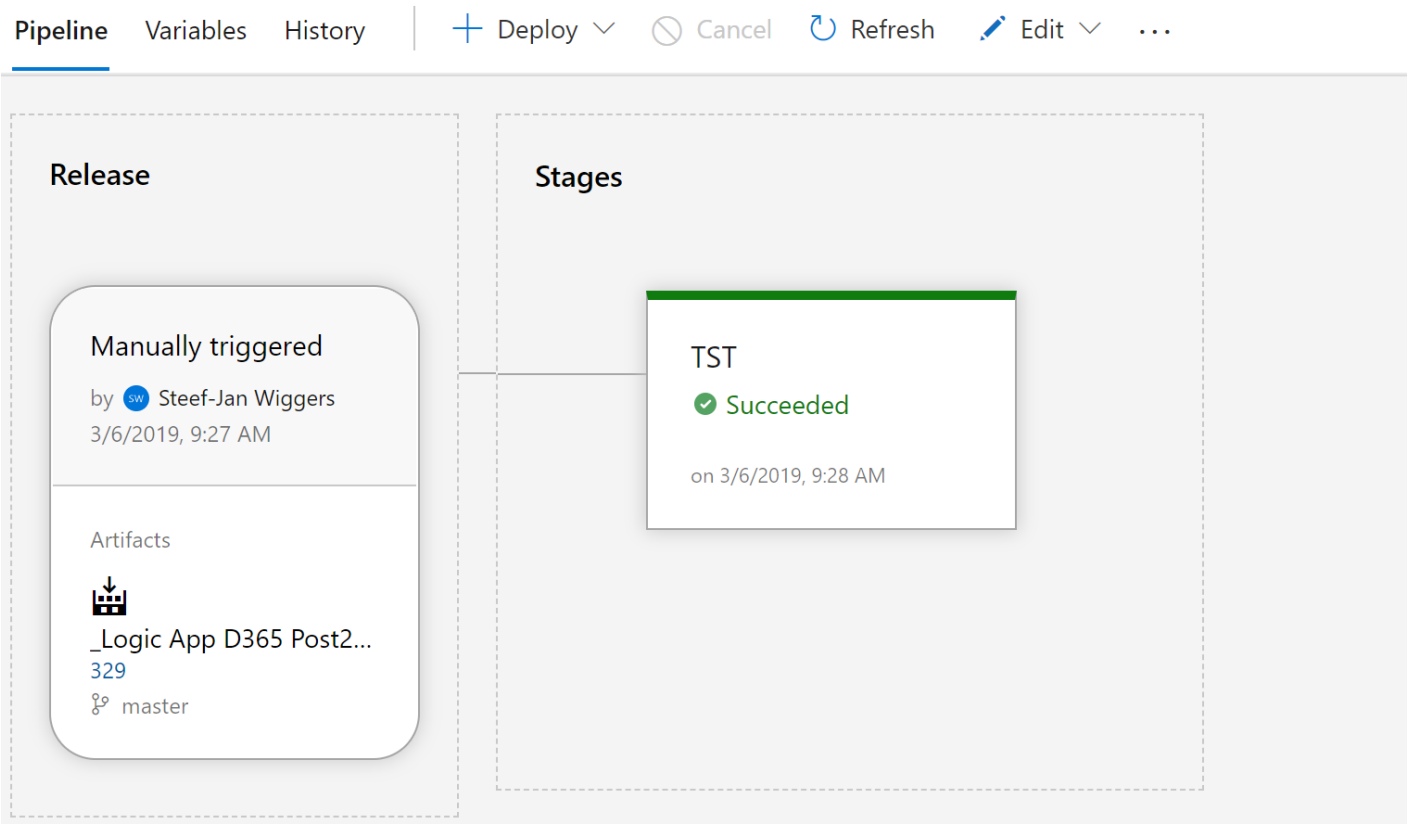
DevOps

Visual Studio

Resource Group Project				
ARM Template	Edit in Designer	Deploy	Source Control	CI/CD

Cloud Explorer				
Browse Azure	Edit in Designer	Manage	Execute & Monitor	Download

Demo - DevOps


Pipeline
Variables
History
Deploy
Cancel
Refresh
Edit
Release
Manually triggered
by Steef-Jan Wiggers
3/6/2019, 9:27 AM
Artifacts
_Logic App D365 Post2...
329
master
Stages
TST
Succeeded
on 3/6/2019, 9:28 AM

Tips – Mapping options

- XML and JSON mappings
- Integration Account
- Alternative is Azure Functions

B2B Messaging

Trading Partners

EDI

Integration Account

XML & Flat File Handling

Liquid Transforms

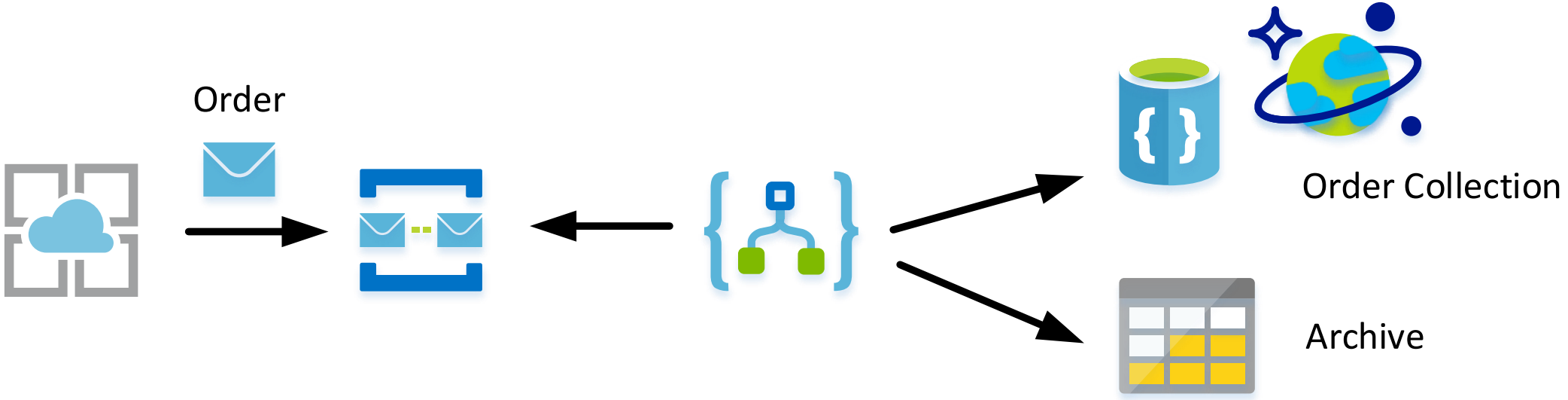
Business Tracking

Tip – Function expressions

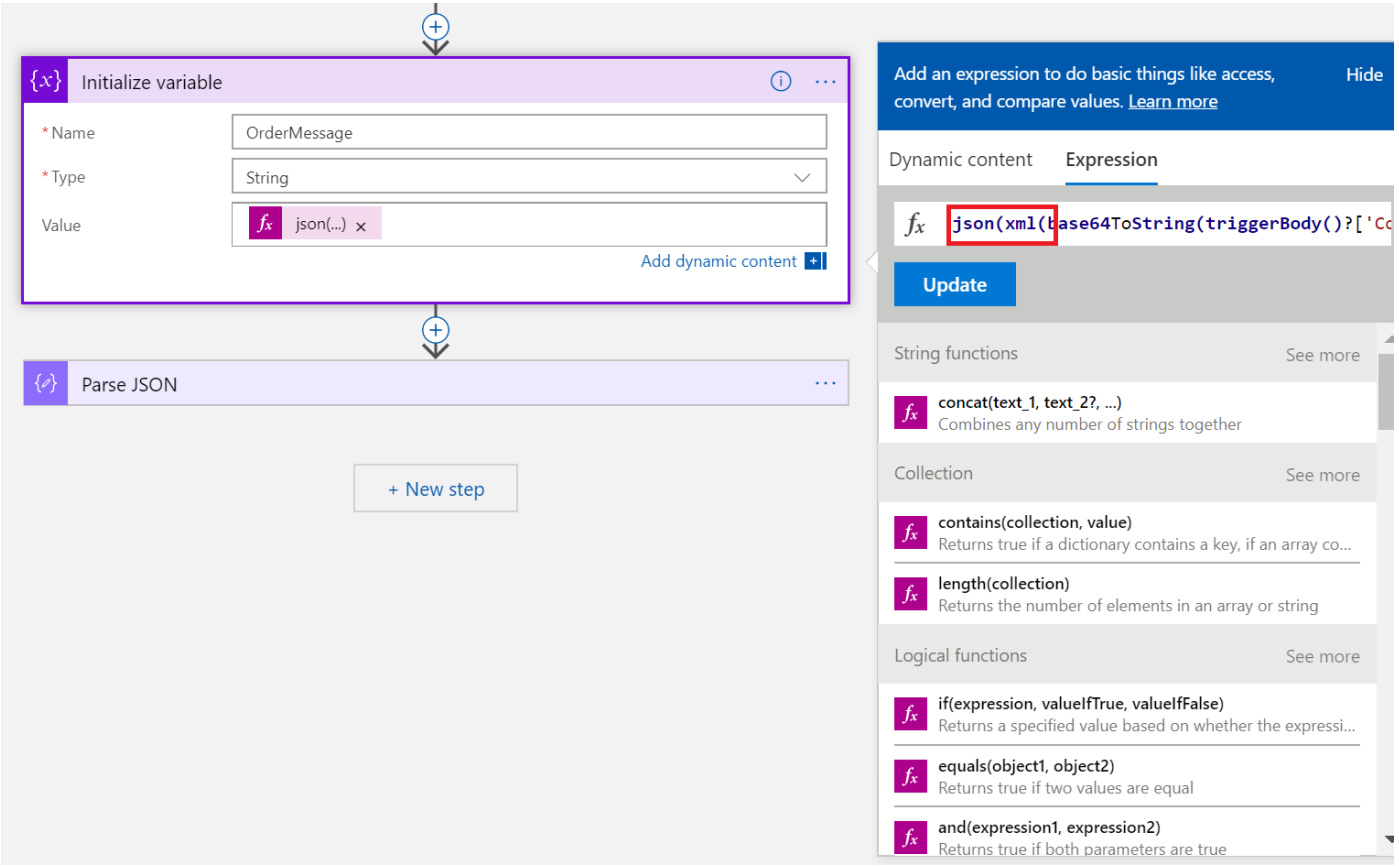
- Perform actions in Runtime:
  - - String Functions
  - - Collection Functions
  - - Logical Comparison
  - - Conversion Functions
  - - Math functions
  - - Date and time functions
  - - Workflow functions
  - - URI Parsing functions
  - - Manipulation functions: JSON and XML

- Source: https://docs.microsoft.com/en-us/azure/logic-apps/workflow-definition-language-functions-reference

Scenario



Conversions

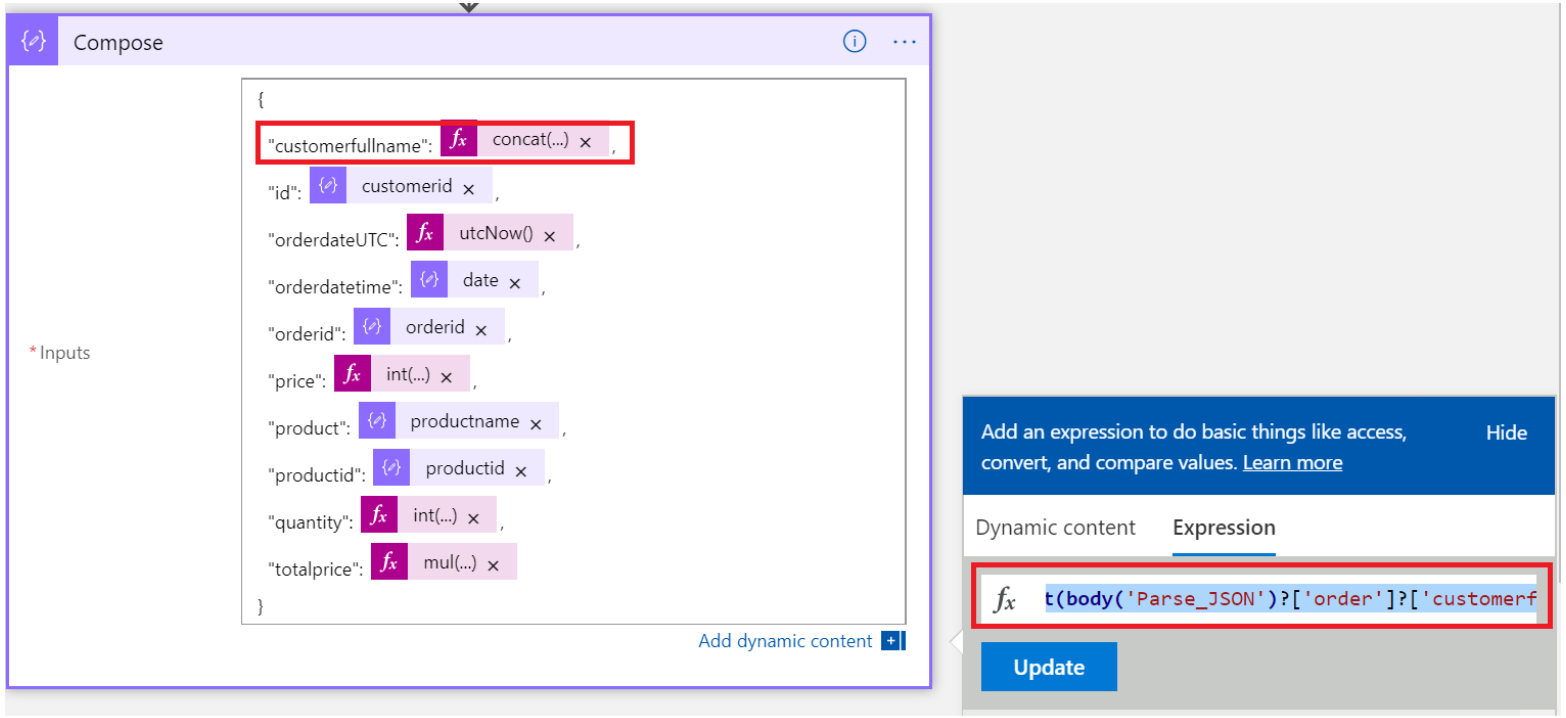


Conversions to other types, data or format. For instance, *base64ToString*.

When working with JSON objects and XML node you can use functions like *addProperty*, *xml*, *json* and *coalesce*.

Conversions - continued

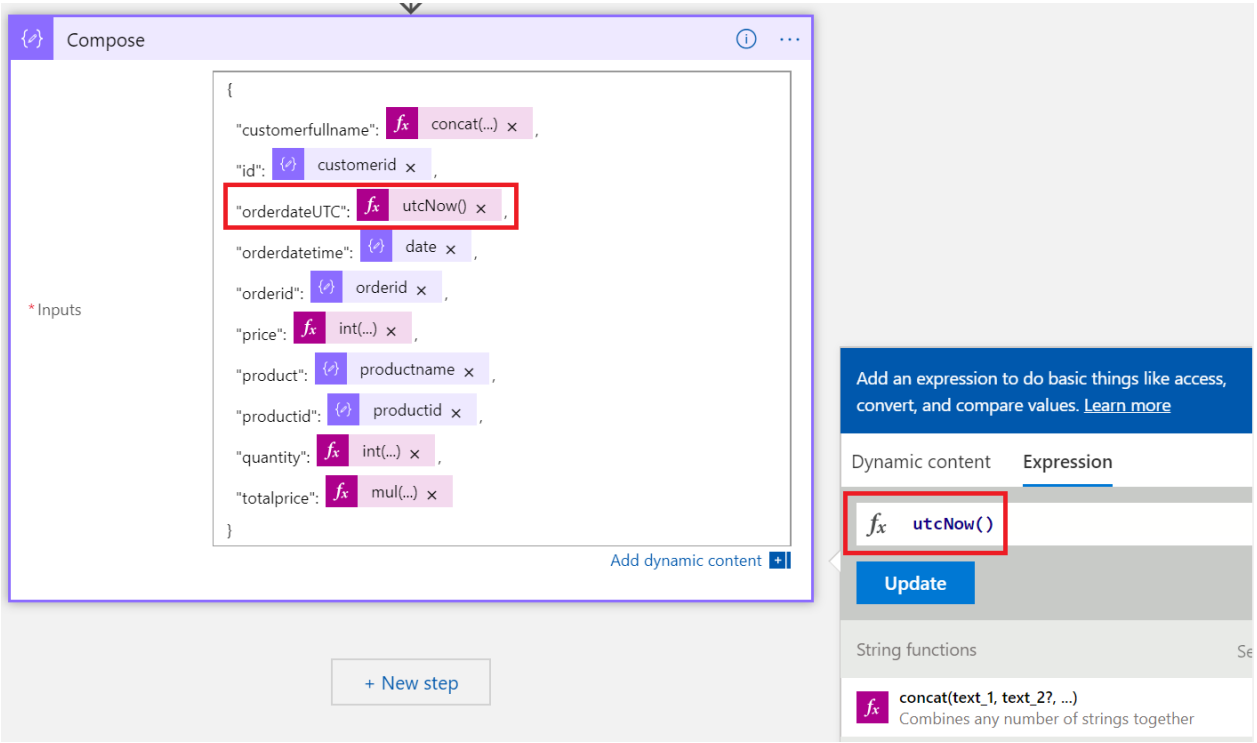
- Manipulating string such as *concat*, *split*, *replace*, and *substring*



concat(body('Parse_JSON')?['order']?['customerfirstname'],body('Parse_JSON')?['order']?['customerlastname'])

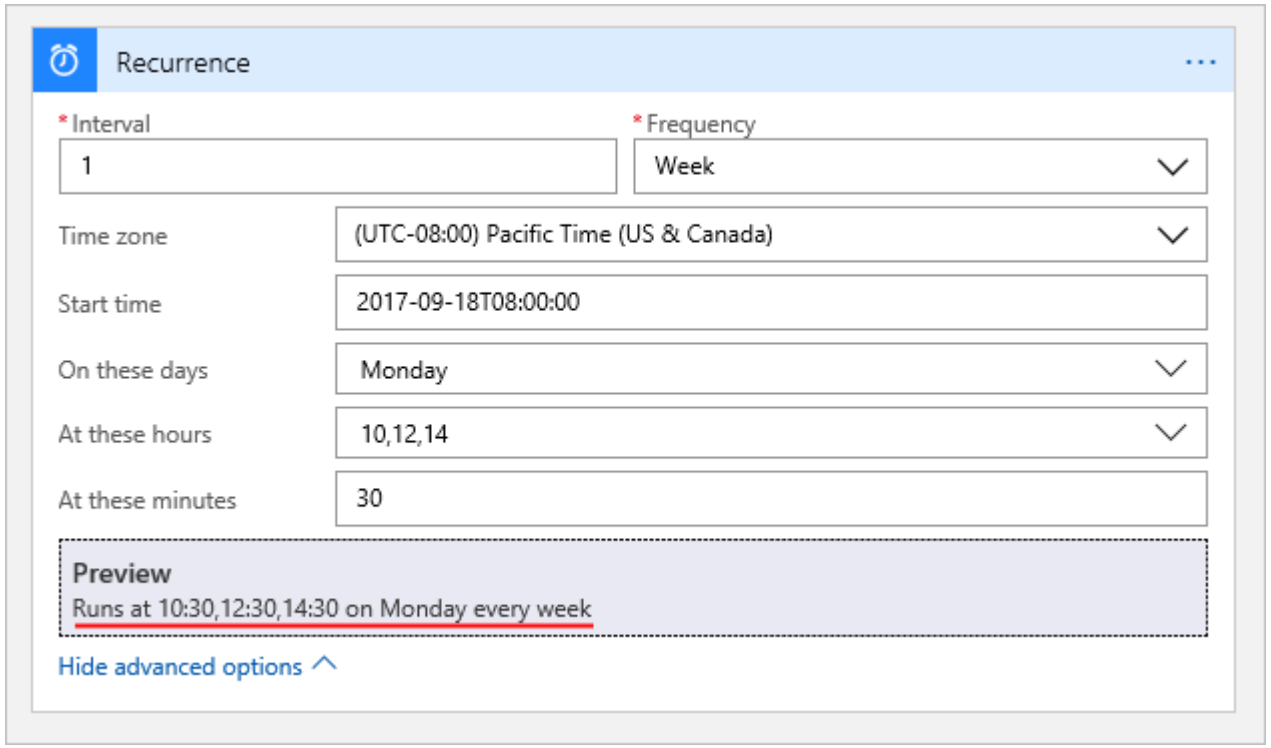
Conversions - continued

- To manipulate date and time data types: *utcNow*, *addDays*, *addSeconds*, or *ConvertTimeZone*.



Tip – Schedule Tasks

```
{
    "triggers": {
        "Recurrence": {
            "type": "Recurrence",
            "recurrence": {
                "frequency": "Week",
                "interval": 1,
                "schedule": {
                    "hours": [
                        10,
                        12,
                        14
                    ],
                    "minutes": [
                        30
                    ],
                    "weekDays": [
                        "Monday"
                    ]
                },
               "startTime": "2017-09-07T14:00:00",
               "timeZone": "Pacific Standard Time"
            }
        }
    }
}
```



Note: Azure Logic Apps is replacing Azure Scheduler, which is being retired. To schedule jobs, try Azure Logic Apps instead.

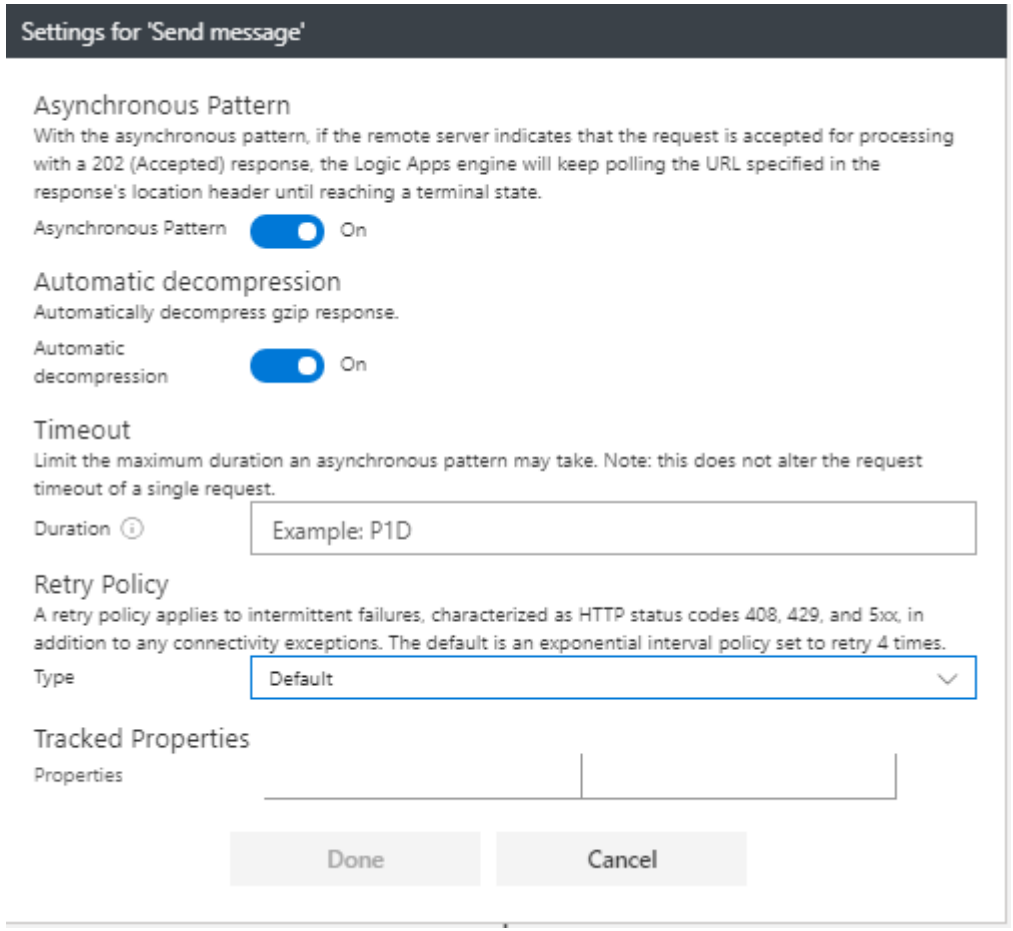
Tips – Making Logic Apps Robust

- Retries
- Scopes
- Run After

Retry policies

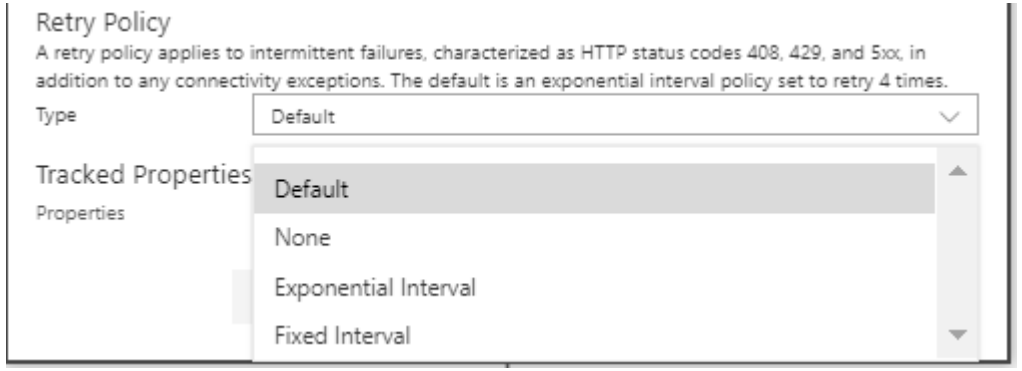
- Retry policies can become active once an action fails. They ensure that the action is retried automatically, before the Logic App ends in a failed state.

- Logic Apps only retries transient errors
  - If HTTP status code equals:
    - HTTP 408
    - HTTP 429
    - HTTP 5XX
  - If HTTP times out



Retry policies

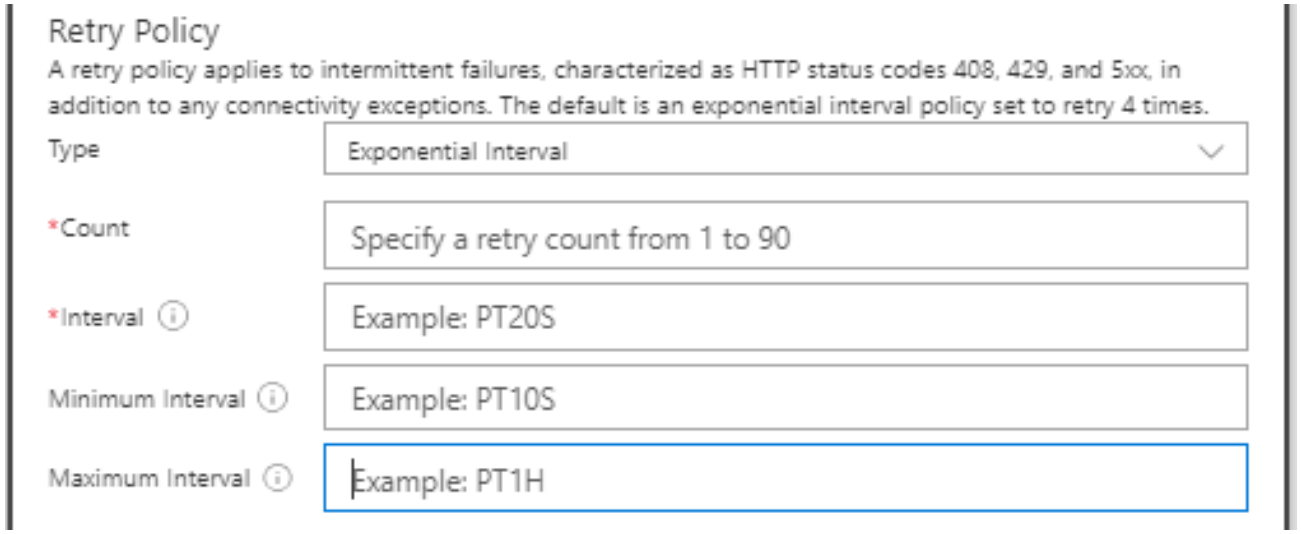
- Default:
  - Retry 4 times, with 20 sec interval
- None:
  - No retries, fail immediately
- Exponential:
  - Configure exponential back off retry
- Fixed Interval:
  - Configure retry count and interval
  - Duration in [ISO 8601 format]



Retry policies

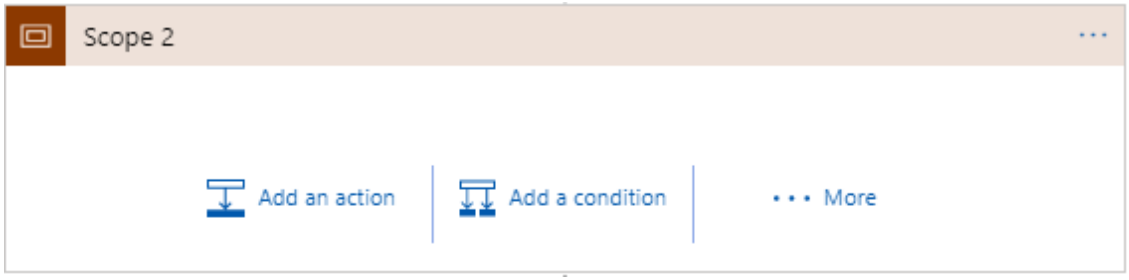
Think about retry policies!

- Only a short retry cycle is accepted for *synchronous* flows
- *Asynchronous* flows are better off with a longer retry policy



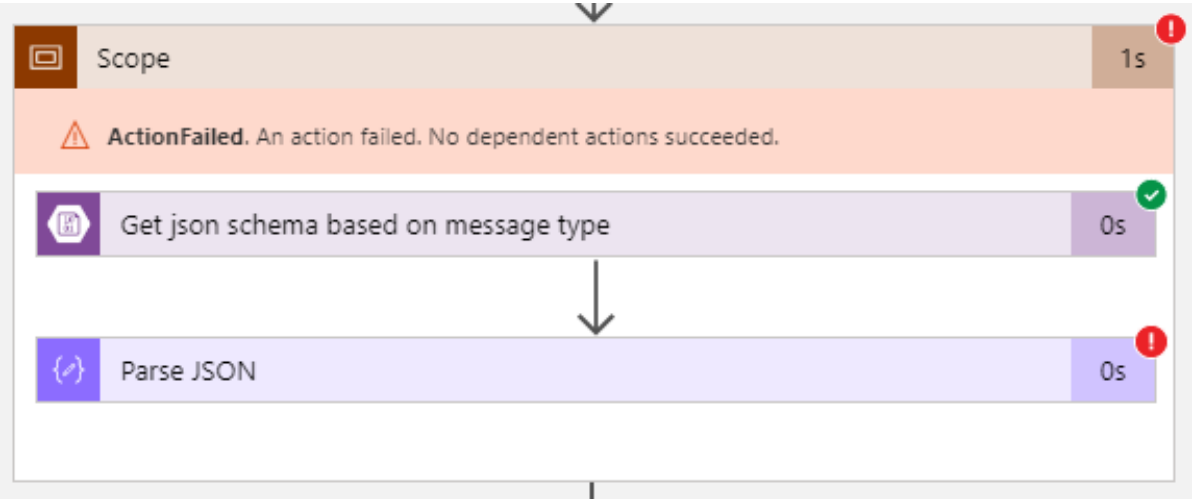
Scopes

- Scopes logically group several actions together. The scope result contains a detailed execution outcome of the actions inside the scope.
- A scope allows you to change the workflow if any of the grouped actions fails.



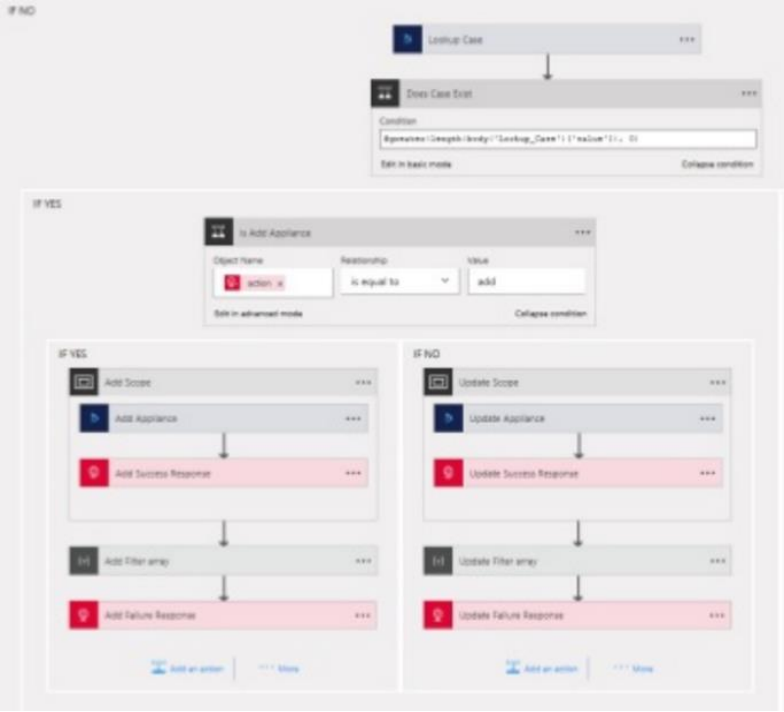
Status of a scope

- Status is set after all actions are finished
- If final action in branch is failed → scope failed

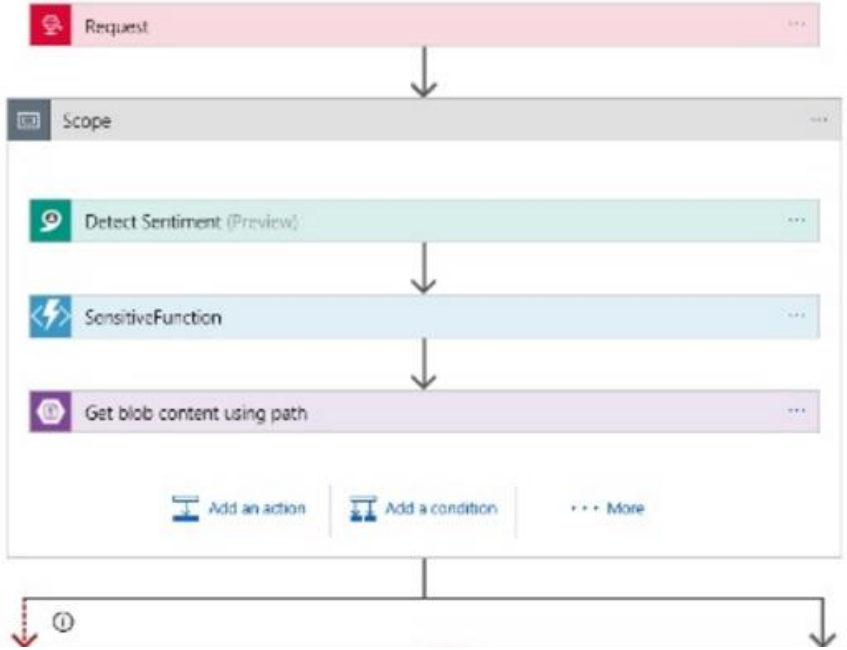


Purpose of a scope

- Logical grouping
  - Make complex workflows more readable



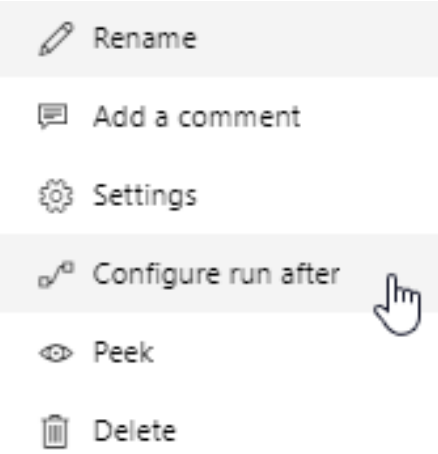
- Use as a “try” bock
  - To compensate in a “catch” block

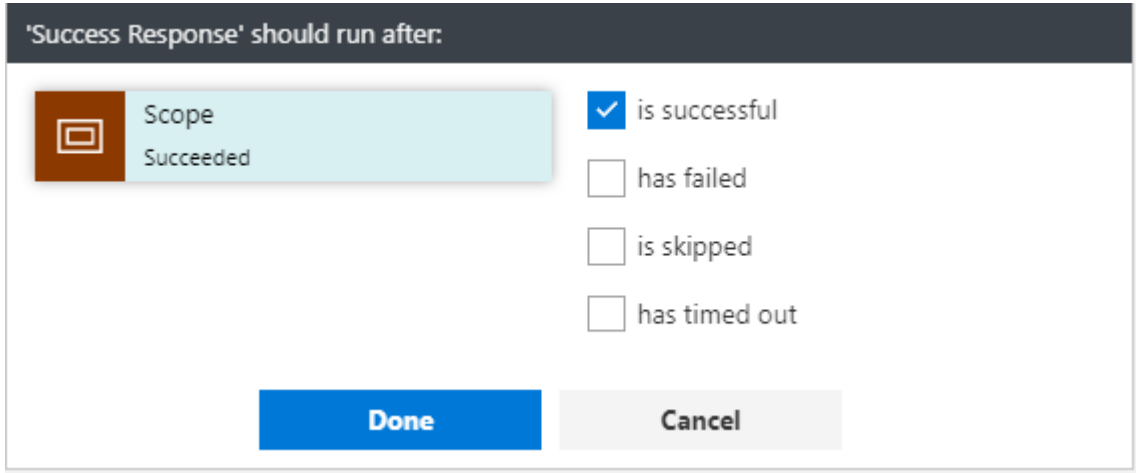


Run after

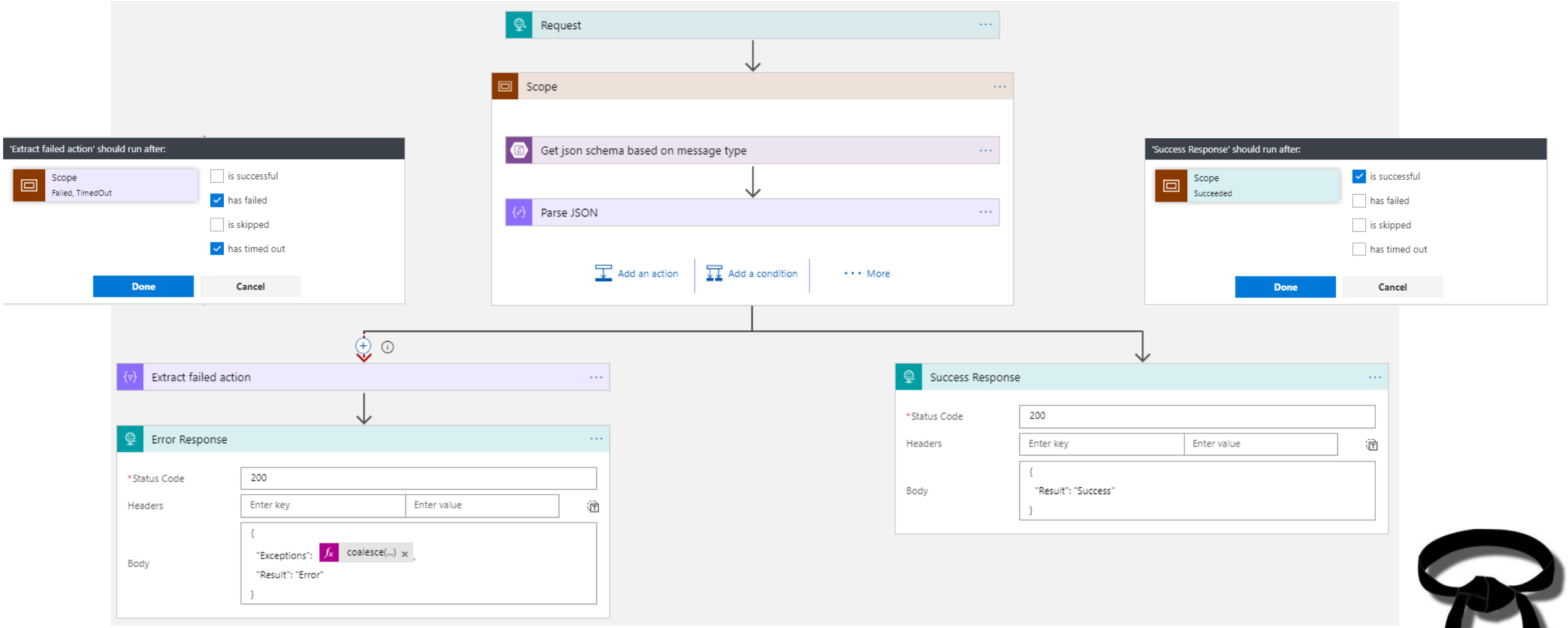
- The RunAfter defines which action must be executed with a specific status, before another action starts.

- Default RunAfter:
  - If previous succeeded
- You can select one of these statuses:
  - Succeeded
  - Failed
  - Skipped
  - Timed Out





Try-Catch


Request
Scope
Get json schema based on message type
Parse JSON
Add an action
Add a condition
More
'Extract failed action' should run after:
Scope
Failed, TimedOut
is successful
has failed
is skipped
has timed out
Done
Cancel
'Success Response' should run after:
Scope
Succeeded
is successful
has failed
is skipped
has timed out
Done
Cancel
Extract failed action
Error Response
*Status Code
200
Headers
Enter key
Enter value
Body
{
"Exceptions":
coalesce(...)
"Result": "Error"
}
Success Response
*Status Code
200
Headers
Enter key
Enter value
Body
{
"Result": "Success"
}

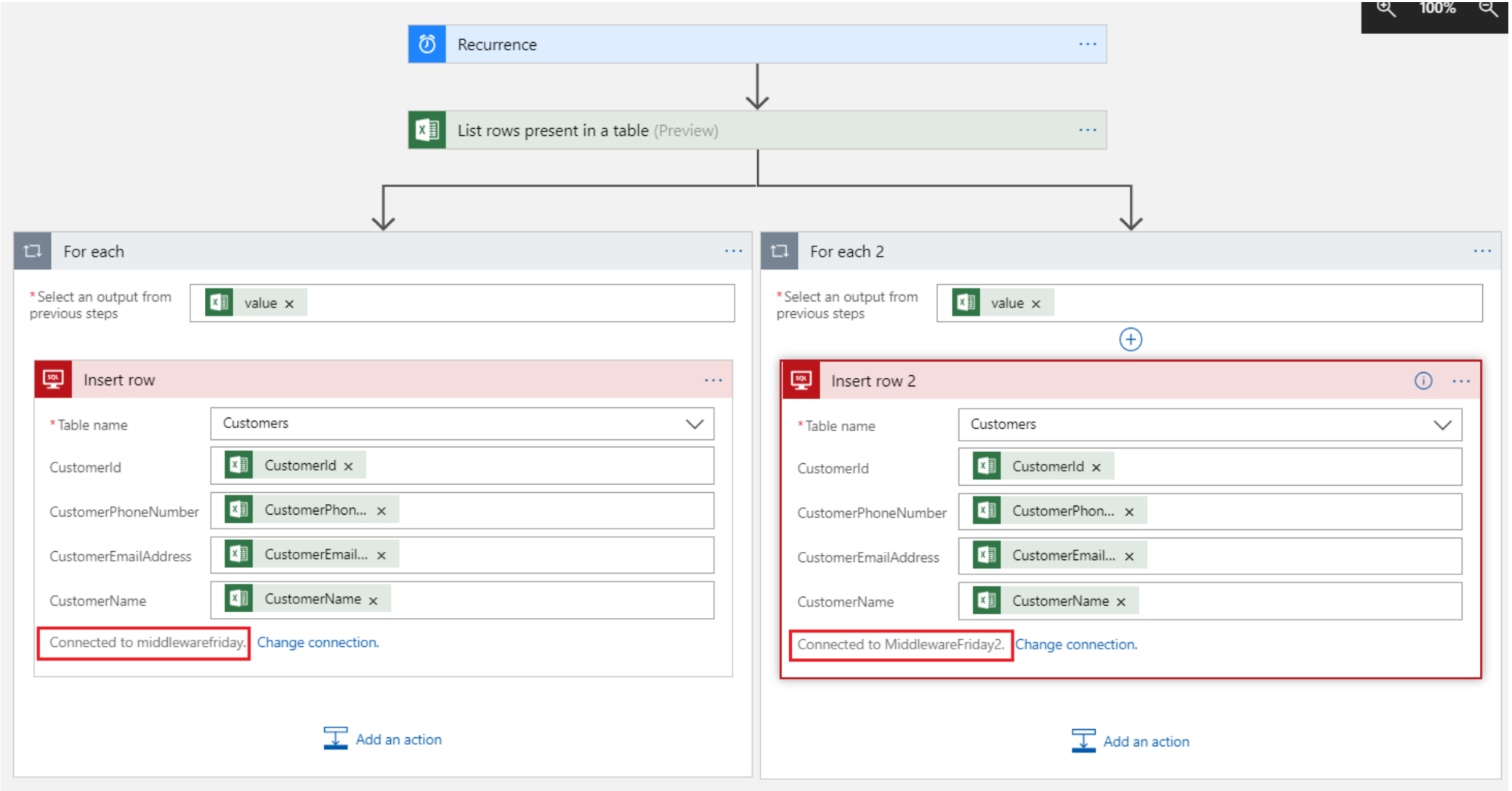
Tips – Avoid Connector Throttling

- Each connector has different throttling limits!
  - For instance: SQL Server connector allows for 800 calls per 10 seconds
- Push too much: HTTP 429

A 429 error represents 'too many requests' and forces the client to wait before sending a subsequent request. This creates delays in processing and can impact business process performance.

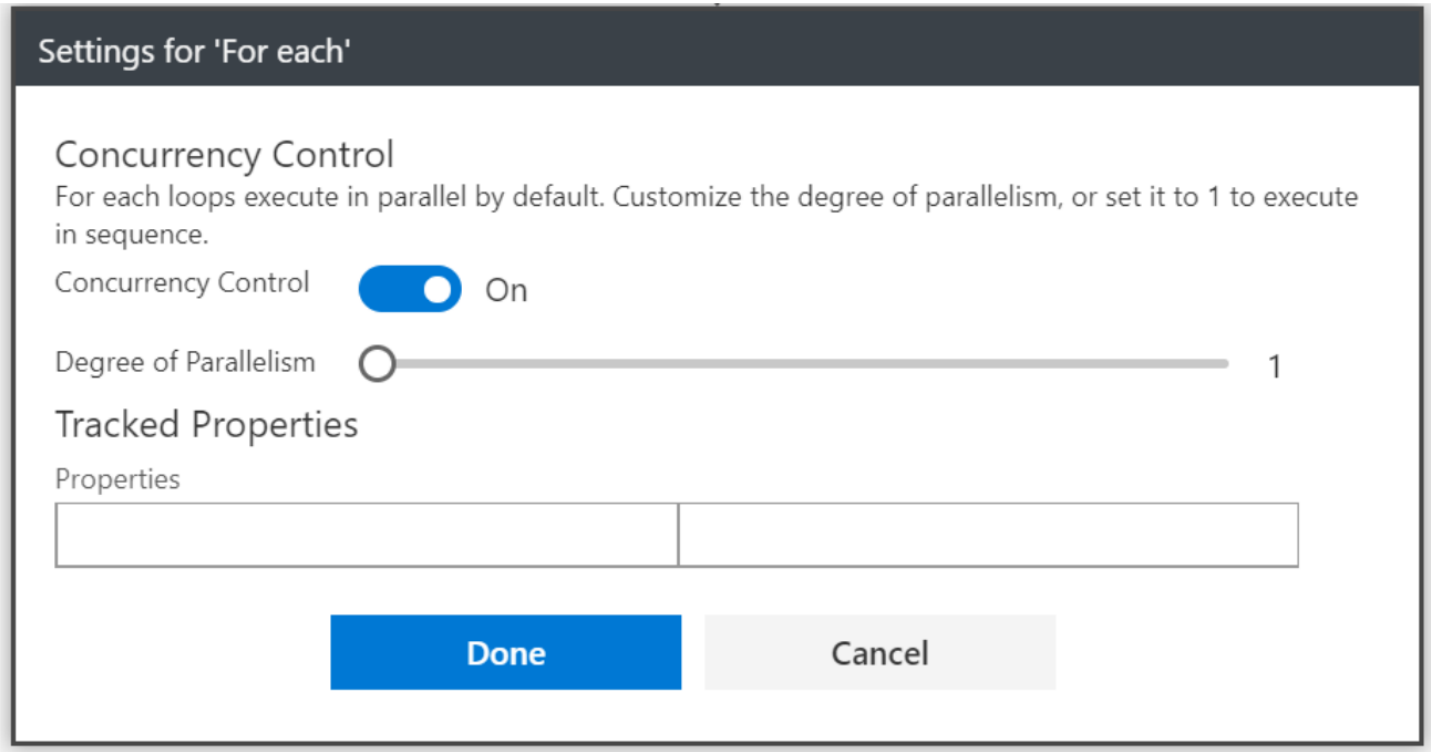
To avoid rate limiting - create multiple connections and then parallelize your processing.

Tips – Avoid Connector Throttling



Tip – Improve Performance

- Singleton setting concurrency to 1 (first in, first out)
- Parallelism up to 50

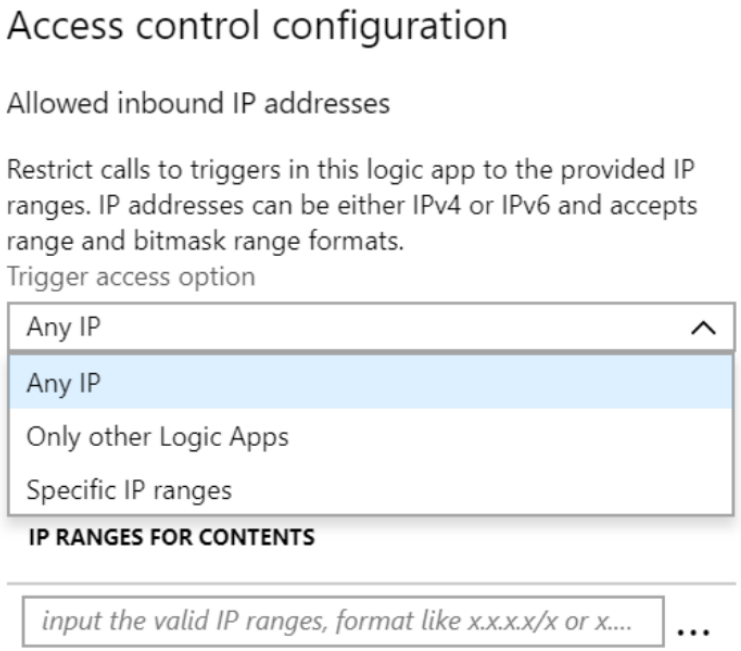


Tips – Secure HTTP Endpoints

- By default there is a SAS key in the URL of the endpoint

https://prod-60.westeurope.logic.azure.com:443/workflows/f3f11467cfd841ff94c12f11c947c565/triggers/request/paths/invoke?api-version=2016-10-01&sp=%2Ftriggers%2Frequest%2Frun&sv=1.0&**sig=AqrIM3fVZb000eh7YfN3pb2TWbWLzuPGzk54jzp5kNA**

- Further hardening of the endpoint can be:
  - IP Whitelisting
  - API Management



Wrap-up

- Versatile workflow cloud service
- Supports many integration type scenarios
- No steep learning curve
- Solving the business problem first
- Less cost, fast time to market
- High level of maturity

Resources

- Logic App Documentation: https://docs.microsoft.com/en-us/azure/logic-apps/
- Serverless notes: https://www.serverlessnotes.com/
- Codit Blog: https://www.codit.eu/blog/
- Serverless360: https://www.serverless360.com/?s=Logic+Apps
- Middleware Friday: http://www.integrationusergroup.com/middleware-friday/
- YouTube: https://bit.ly/2N1iA8W
- Logic App Blog: https://blogs.msdn.microsoft.com/david_burgs_blog/tag/logic-apps/
- Pluralsight:
  - https://www.pluralsight.com/courses/azure-logic-apps-fundamentals
  - https://www.pluralsight.com/courses/azure-logic-apps-getting-started

Do you feel your expert now?

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Microsoft

kapacity Business Analytics

unit it

Expo partners

The Software Experts Crayon

solvo it den rigtige løsning

Jabra GN

CT Global

Expo light partners

GLAZE EVERYTHING INTELLIGENT

NEXTAGENDA BUSINESS INTELLIGENCE LØSNINGER

SUPERUSERS

PROACTIVE

accobat Know your business

15:00
16:00

Room 1 (IMAX)	**Advanced Data Factory: Let the Data Flow!** Simon Whiteley Data Platform · Business Intelligence · Cloud in the Enterprise	
Room 6	**8 lessons learned running K8S with Azure Kubernetes Service** Pascal Naber Cloud Management · Cloud in the Enterprise · Cloud Native	
Room 7	**Aggregations in Power BI** Marco Russo Business Intelligence	
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