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Technical Integration Architect – HSO

Unlock Dynamics365 with Azure Integrating Services

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QUIBIQ

Gold

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DEKIRU | SOLUTIONS

Technology Partner

 **Microsoft**

Me



Technical Architect



Lead Cloud Editor



Azure MVP



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Professional

Board Member Azure User Group NL



You



- Dynamics 365 Finance and Supply Chain Management
- Focus Manufacturing
- Enterprise Integration Options with D365
- Real world examples
- Challenges/Considerations
- Key Takeaways
- Materials (Deck/Diagrams)

<https://qrco.de/bd5DiW>





D365



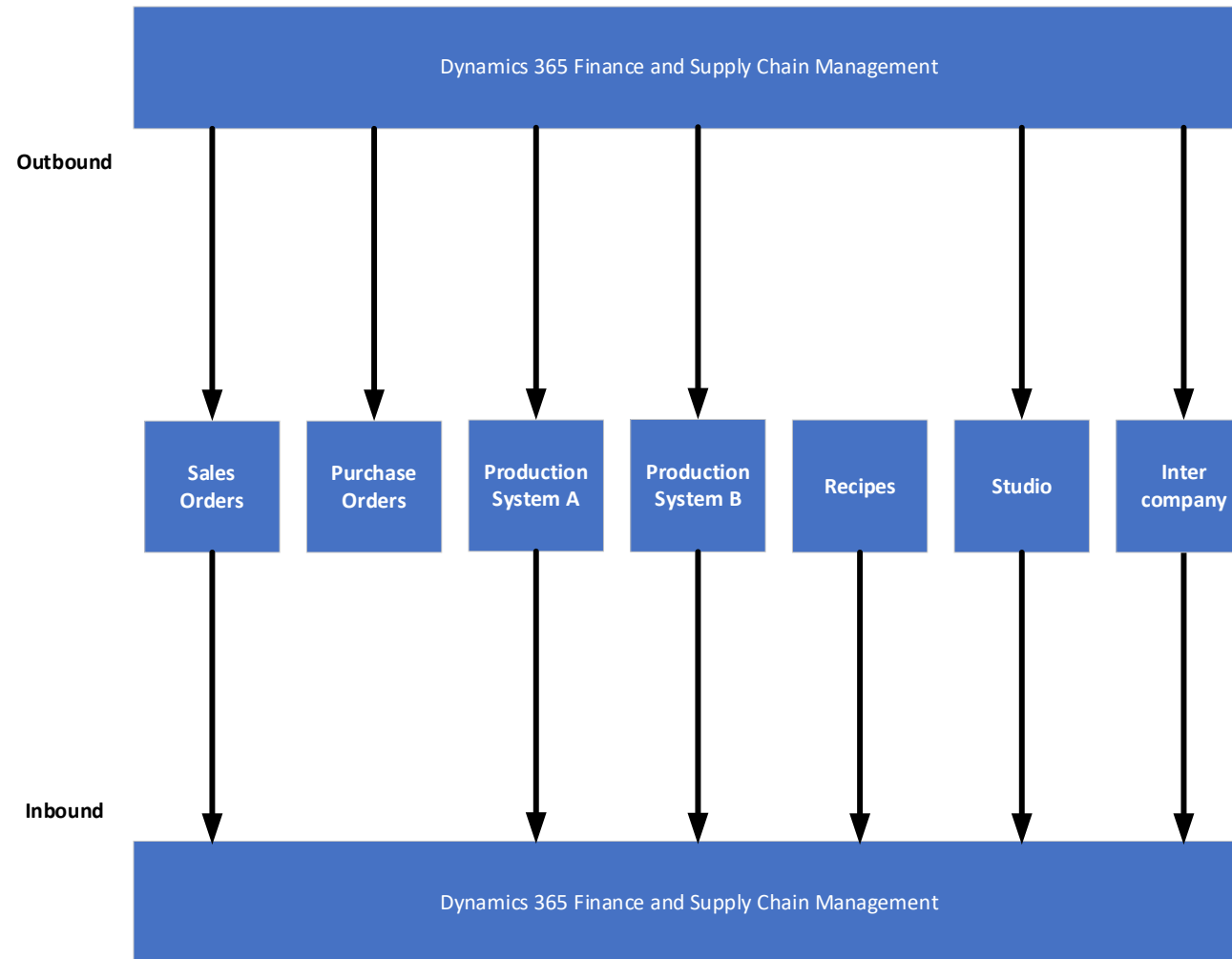
- Microsoft offers Dynamics 365 as a Customer Relation Management (CRM) and **Enterprise Resource Planning (ERP)** Management software for industry verticals such as **manufacturing**, healthcare, finance, and retail.
- With D365, enterprises can streamline administrative processes in their sales, marketing, and service divisions with CRM or unify and automate business processes by leveraging ERP.

Enterprise Resource Planning



- ERP is:
 - a process of managing all resources (business function application) and their use in the entire enterprise in a coordinated manner
 - a series of integrated business applications or modules that perform standard business functions such as general ledger, sales forecasting, etc....
 - supporting the business through optimization, maintaining, and tracking business functions: HR, financial, manufacturing, retail, etc.

D365 FSCM – Integration



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EAI Options D365 FSCM

- OData
- Custom Webservices
- Recurring Integrations
- Business Events
- Consuming External Web Services



OData

- OData is an open-source protocol for serving and consuming interoperable data via Representational State Transfer (REST)-full APIs using everyday query operations - *create, read, update, and delete* (CRUD).
- Uses web technologies like HTTP and JavaScript Object Notation (JSON) to access data from various entities
- D365FSCM exposes all its public data entities as OData endpoints:
[Your organization's root URL]/data/

The screenshot shows a configuration window titled 'HTTP Sales order header'. It contains the following sections:

- * Method:** A dropdown menu set to 'GET'.
- * URI:** A text field containing 'D365URL x /data/HSOSalesOrderHeaders'.
- Headers:** A table with columns 'Enter key' and 'Enter value'.
- Queries:** A complex query editor showing a filter: 'SalesId eq 'SalesOrderid x' and dataAreaId eq 'LegalEntity x''. Below the filter are fields for '\$top' (set to 1), 'cross-company' (set to true), and another 'Enter key' / 'Enter value' pair.
- Body:** A text field labeled 'Enter request content'.
- Cookie:** A text field labeled 'Enter HTTP cookie'.
- Authentication:** A section with a dashed border containing:
 - * Authentication type:** A dropdown menu set to 'Active Directory OAuth'.
 - Authority:** A text field labeled 'Enter authority'.
 - * Tenant:** A text field containing 'Tenant x'.
 - * Audience:** A text field containing 'D365URL x'.
 - * Client ID:** A text field containing 'Clientid x'.
 - * Credential Type:** A dropdown menu set to 'Secret'.
 - * Secret:** A text field containing 'value x'.

Custom Web Services



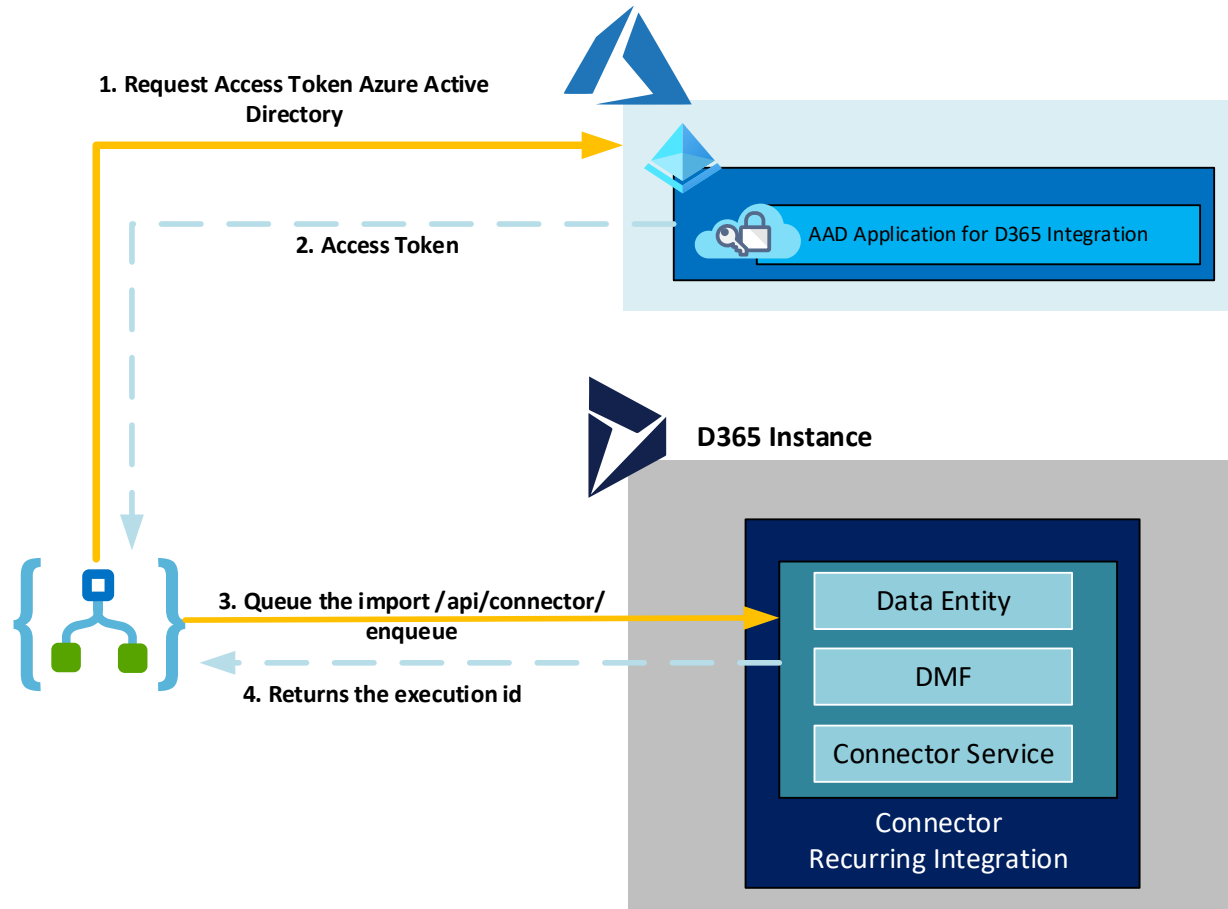
- Custom Services is by far the most flexible and customizable method of integrating with D365FSCM
- Built using standard D365FSCM X++ code and can be used for both data-based and operation-based integrations
- When you deploy a custom service, the following endpoints are created, which you can access remotely via standard AAD OAuth authorization and SOAP/REST HTTP calls:
 - **SOAP:** <https://<d365url>/soap/services/<servicename>?wsdl>
 - **JSON:** https://<d365url>/api/services/<servicegroupname>/<servicename>/<operation_name>

Recurring Integrations



- *Recurring integrations* is a D365FO data integration platform based on Data Management Framework and data entities that enable automated data exchange between third-party data providers.
- You can configure the third-party integrators to use the *Recurring Integration platform REST APIs* to import and export data from and to D365FO

Example – Recurring Integration



1. The third-party client application (Logic App) authenticates to the Azure AD token issuance endpoint and requests an [access token](#).
2. The Azure AD token issuance endpoint issues the access token.
3. The access token authenticates to the D365FO DMF and initiates the import or Export Job. By calling the API endpoint.
4. The execution id of the Job is returned.

Business Events



- Business events will enable you to notify Azure event handlers and trigger-based workflow providers of D365FSCM business events
- There are many out-of-the-box events available, and you can create new custom ones using X++ programming.
- You can use standard HTTP methods to send notifications from these events to Azure endpoints such as **Service Bus, Event Hub, Event Grid, and Logic Apps (or Power Automate)** and custom **HTTPS endpoints**.

Example – Business Event

- A D365 Admin can navigate to the Business Event page. Select Endpoints and click +New.
- A dialog will appear where the admin needs to select Azure Event Grid.
- Next, the endpoint needs a few settings

Setting	Value	Note
Endpoint URL	For instance: https://evgt-f--common-p.westeurope-1.eventgrid.azure.net/api/events	This is the endpoint URL of the Event Grid Topic in Azure
Azure Active Directory Application ID	GUID	This is the same value as the client id from the previous section
Azure Application Secret	*****	This is secret belonging to the client id
KeyVault DNS Name	For instance: https://kv-common-p.vault.azure.net/	URL (location) of KeyVault
KeyVault Secret Name	evgt-endpoint-access-key	Name of the secret in KeyVault

Configure new endpoint

Endpoint name
EventGrid-PROD

Endpoint type
Azure Event Grid

Endpoint URL
`https://evgt-f--common-p.westeurope-1.eventgrid.azure.net/api/events`

KEY VAULT INFORMATION

Azure Active Directory application ID
`bcd" r0a0-f " e-4c60-ac79-106...`

Azure application secret

Key Vault DNS name
`https://kv- " -i-common-p.vault...`

Key Vault secret name
`evgt- " -i-endpoint-access-key`

For Azure Event Grid endpoints the Key Vault secret name should be a secret containing the credential to the Event Grid

OK Cancel

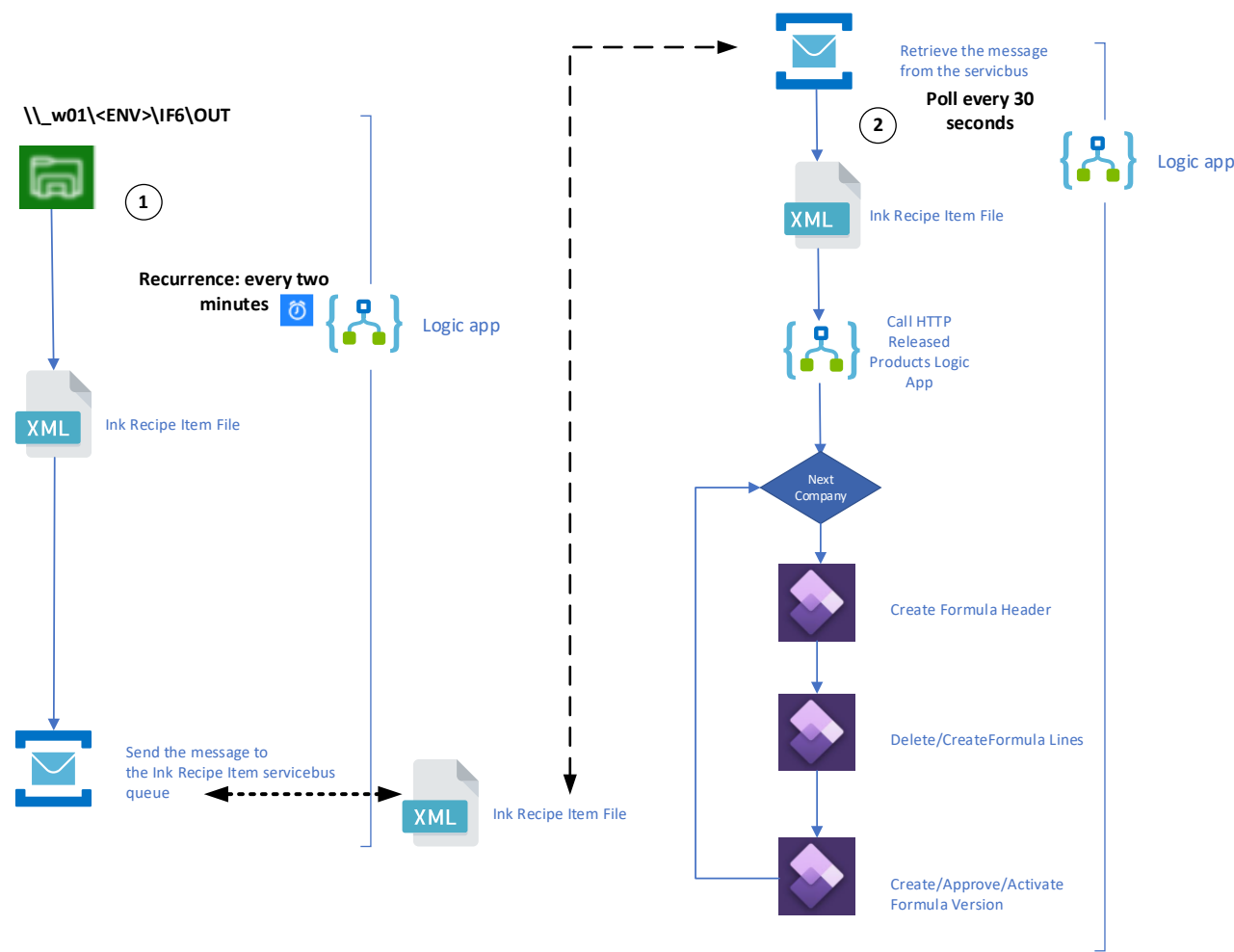
Other Options (Not EAI)

- Consuming External Web Services
- Bring Your Own Database (BYOD)
- Data Lake
- Data Events
- Entity Store
- Dual Write





Real-World OData



OData Sample



HTTP Create Formula Header

0s

INPUTS [Show raw inputs](#)

Method
POST

URI
`https://d365prd.operations.dynamics.com/data/HSOFormulaHeaders`

Body

```
{
  "FormulaName": "r _BLUE0107_GVCT",
  "ProductGroupId": "500",
  "dataAreaId": "fnl1"
}
```

[Show more](#)

OUTPUTS [Show raw outputs](#)

Status code
201

Headers

Key	Value
Transfer-Encoding	chunked
Strict-Transport-Security	max-age=31536000; includeS...
X-Content-Type-Options	nosniff

Body

```
{
  "@odata.context": "https://d365prd.operations.dynamics.com/data/$metadata#HSOFormulaHeaders/$entity",
  "@odata.etag": "W/\"JzEsNTYzNzg2MDg2Myc=\"",
  "dataAreaId": "fnl1",
  "FormulaId": "B_11_151.1",
  "ProductGroupId": "500",
  "ApproverPersonnelNumber": "",
  "IsApproved": "No",
  "FormulaName": "XXX_BLUE0107_GVCT",
  "ProductionSiteId": ""
}
```

Request:

```
{
  "uri": "https://d365prd.operations.dynamics.com/data/HSOFormulaHeaders",
  "method": "POST",
  "authentication": {
    "authority": "",
    "tenant": "<tenant>.onmicrosoft.com",
    "audience": "https://d365prd.operations.dynamics.com",
    "clientId": "bcd2e0a0-561e-4c60-ac79-106eae6a9573",
    "secret": "*sanitized*",
    "type": "ActiveDirectoryOAuth"
  },
  "body": {
    "FormulaName": "XXX_BLUE0107_GVCT",
    "ProductGroupId": "500",
    "dataAreaId": "fnl1"
  }
}
```

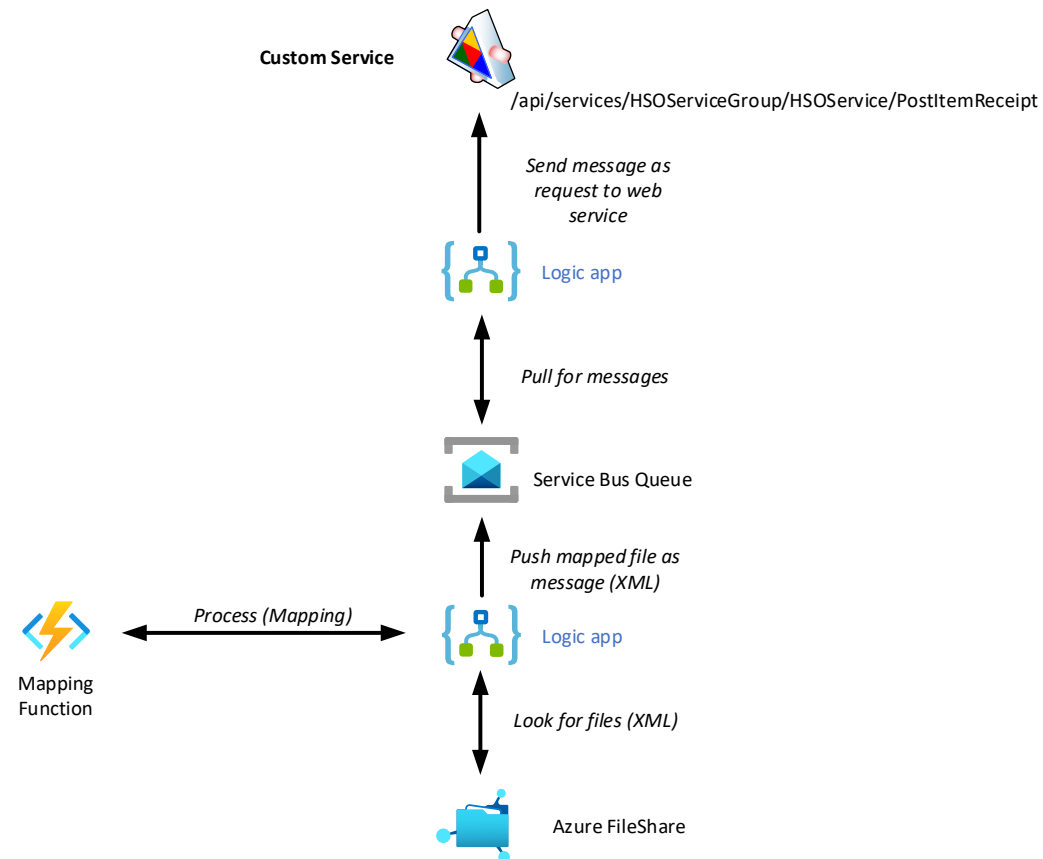
Response:

```
{
  "@odata.context": "https://d365prd.operations.dynamics.com/data/$metadata#HSOFormulaHeaders/$entity",
  "@odata.etag": "W/\"JzEsNTYzNzg2MDg2Myc=\"",
  "dataAreaId": "fnl1",
  "FormulaId": "yyy1025cc44",
  "ProductGroupId": "500",
  "ApproverPersonnelNumber": "",
  "IsApproved": "No",
  "FormulaName": "XXX_BLUE0107_GVCT",
  "ProductionSiteId": ""
}
```

Real-World Custom Webservice



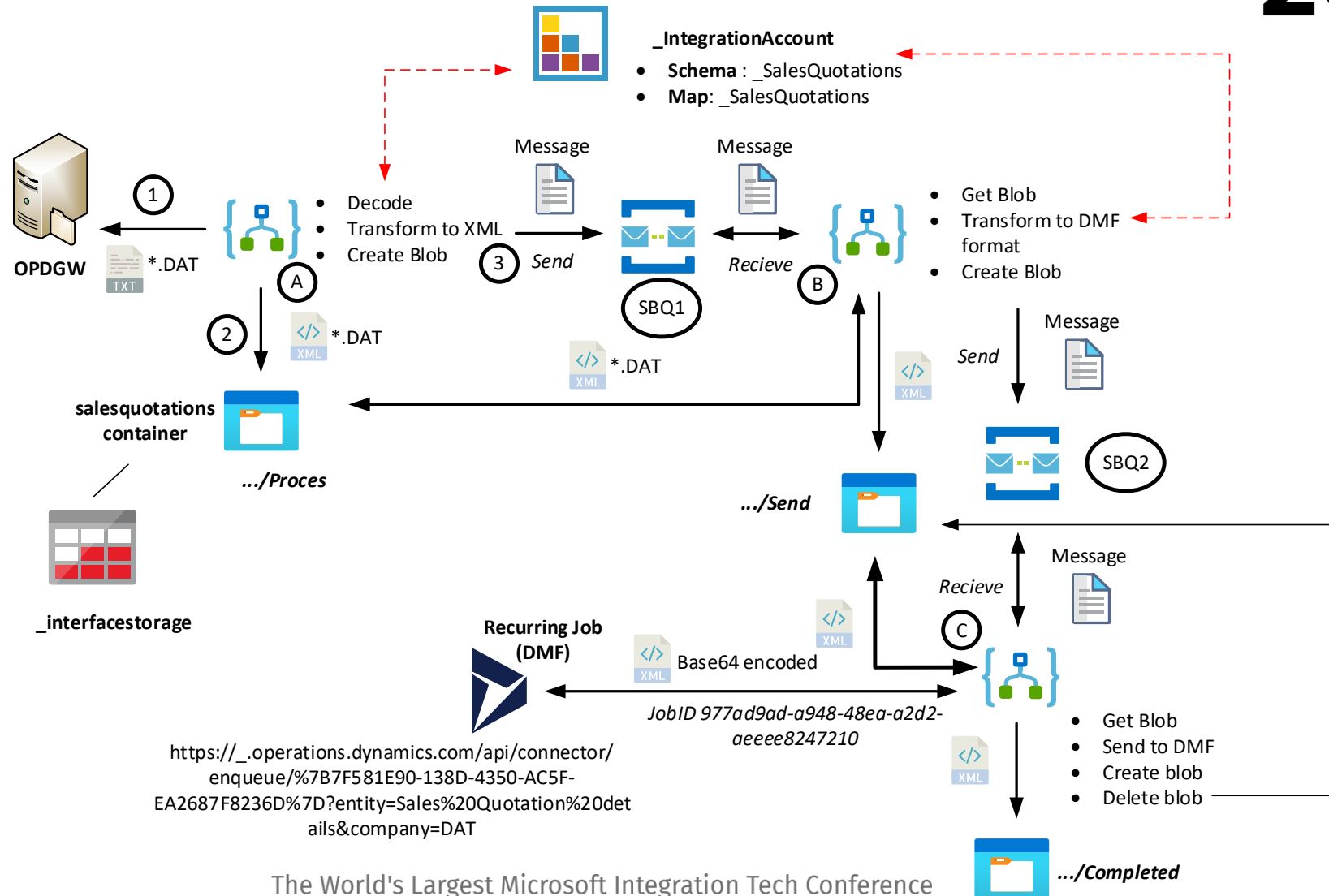
Dynamics 365 Finance and Supply Chain Management



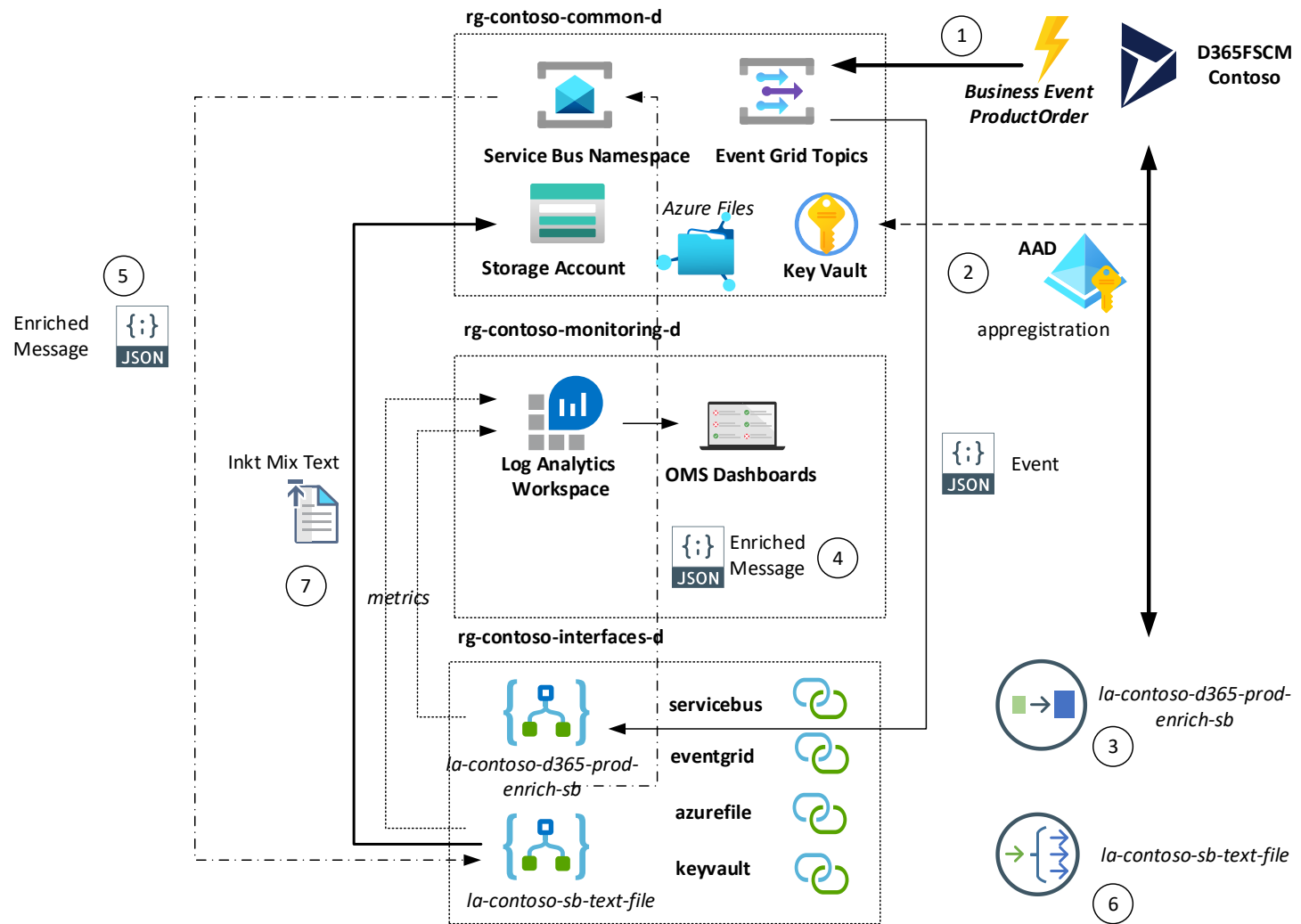
Real-World Recurring Integration

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INTEGRATE
2022



Real-World Business Event



Sample Business Event



When a resource event occurs

INPUTS [Show raw inputs](#)

Subscription
@{encodeURIComponent('ec9877d0-d1c9-404c-9119-6fbc0d20d035')}

Resource Type
@{encodeURIComponent('Microsoft.EventGrid.Topics')}

Resource Name
evgt-fs-common-p

properties
{
 "endpointUrl": "@{listCallbackUrl()}"
}

Event Type
{
 "HSSalesOrderConfirmedBusinessEvent"
}

OUTPUTS [Show raw outputs](#)

Headers

Key	Value
Connection	close
Accept-Encoding	gzip.deflate
Host	prod-248.westeurope.azure.com

Body

```
{  
  "id": "8FB15464-07EF-418A-8B90-65A162643B50",  
  "eventType": "HSSalesOrderConfirmedBusinessEvent",  
  "subject": "SalesOrder_HSSalesOrderConfirmedBusinessEvent_FNL1",  
  "data": "{ \"BusinessEventId\": \"HSSalesOrderConfirmedBusinessEvent\",  
    \"ConfirmDate\": \"2022-06-03T07:31:18Z\" }",  
  "dataVersion": "0.0",  
  "metadataVersion": "1",  
  "SalesOrderId": "CS01-013988"  
}
```

```
{  
  "BusinessEventId":  
    "HSSalesOrderConfirmedBusinessEvent",  
  "ConfirmDate": "/Date(1654214400000)/",  
  "ConfirmId": "CSC0004446",  
  "ControlNumber": 5637900584,  
  "EventId":  
    "8FB15464-07EF-418A-8B90-65A162643B50",  
  "EventTime": "/Date(1654241478000)/",  
  "InvoiceAccount": "C1000341",  
  "InvoiceAmountInAccountingCurrency": 0,  
  "LegalEntity": "fnl1",  
  "MajorVersion": 0,  
  "MinorVersion": 0,  
  "SalesOrderId": "CS01-013988"  
}
```

Comparing the options



Integration Method	Pro	Con
OData	<ul style="list-style-type: none">• Open and standard data integration protocol with many data inquiry and CRUD commands out of the box• Support for extending with custom data actions• OData-ready software can directly be integrated using existing endpoints	<ul style="list-style-type: none">• Performance• Not suitable to be used with complex business logic and queries
Custom Services	<ul style="list-style-type: none">• Highly flexible and customizable• Best performance compared to other integration methods• Support for both operation and data-based integrations• Both SOAP and JSON endpoints are available upon deployment• Can be exposed via Azure API Manager	<ul style="list-style-type: none">• Lack of management and monitoring tools in standard (possible with Azure API Manager)• Development requires an experienced X++ developer• Not suitable out-of-the-box for large data transfers
Business Events	<ul style="list-style-type: none">• Near real-time integration with event-based Azure services and custom HTTPS based services• Trigger methods available for Logic Apps and Power Automate• Leverage business event catalog and flexibility to create custom events	<ul style="list-style-type: none">• Not suitable for large data transfers• Creating custom events requires skilled X++ developers
Recurring Integrations	<ul style="list-style-type: none">• Complete, stable integration platform with valuable features like importing data in a sequence, skipping empty files, etc.• Fully automated and scheduled way of integration• Unlike DMF API, both data file import and package import options are available in the API	<ul style="list-style-type: none">• APIs are fixed and not customizable



Performance



- **Custom Entities:** Lower latency retrieving data
- **Priority-based throttling:** service protection settings that prevent the over-utilization of resources
- **User-based service protection API limits for Finance and Operations:** equivalent to the Power Platform API limits and help prevent individual users or integrations from harming system performance and availability
- **Network:** On-premise Data Gateway, Store Sync, Mounting file share
- **Workloads:** number of messages (volumes), frequencies, and size

Note there is no ideal integration option for Bulk real-time integration with D365FSCM.

Skills

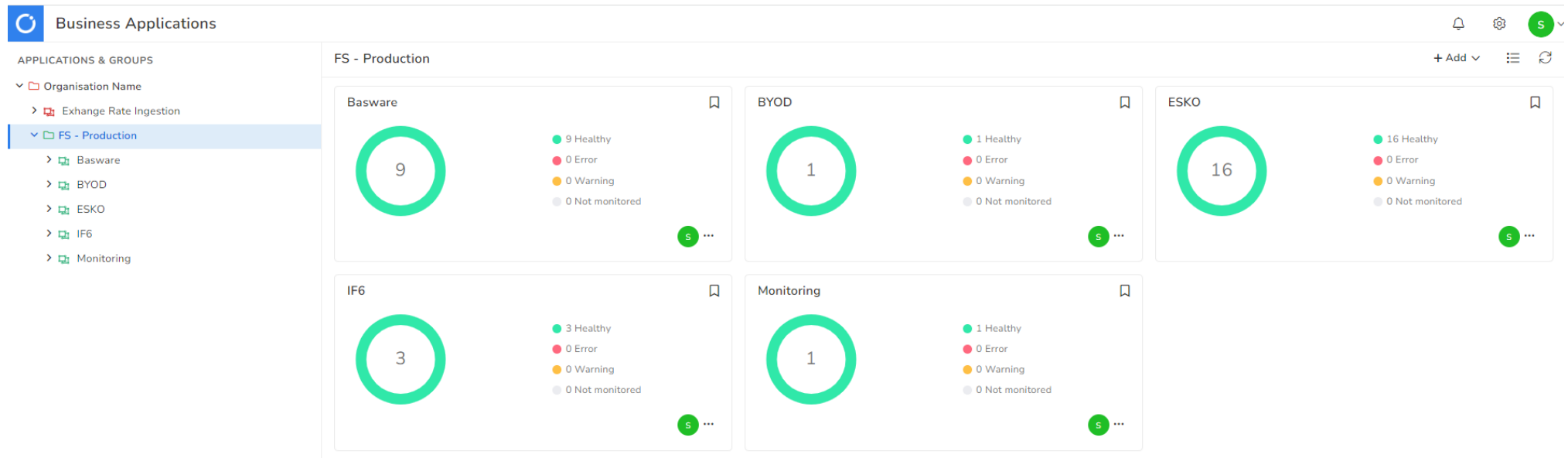


- Azure (Platform)
- Integration (Patterns)
- D365 (Product)
- X++/.NET (Development)
- Bicep/ARM (Deployment)
- Business Process (Sales, Purchase, Production, Logistics)
- Writing (Documentation)
- Communication (Meetings, collaboration)

Support



- **People:** Skills, process knowledge
- **Process:** ITIL process or support model
- **Products:** The tools (Azure Monitor, Third-Party)



Real-world Example



app.serverless360.com/business-applications/Basware/88931571-1000-4122-921c-aad03c6ddb49/resources/logic-apps/la-frits-sb-basware-sftp/9e917efe-9bac-4bd3-9d9a-ce771c168c7a

URI Conventions (O... FujiSeal SPAR MegaGroupTrade

Business Applications

APPLICATIONS & GROUPS

- Organisation Name
 - Production
 - Resources
 - Azure Functions (3)
 - Azure Function Apps (1)
 - Logic Apps (5)
 - la--d365-prod-enrich-sb
 - la--sb-b-sftp**
 - la--d365-po-received-enrich-sb
 - la--d365-po-confirmed-enrich-sb
 - la--d365-schedule

Ba: la--sb-sftp (Logic App)

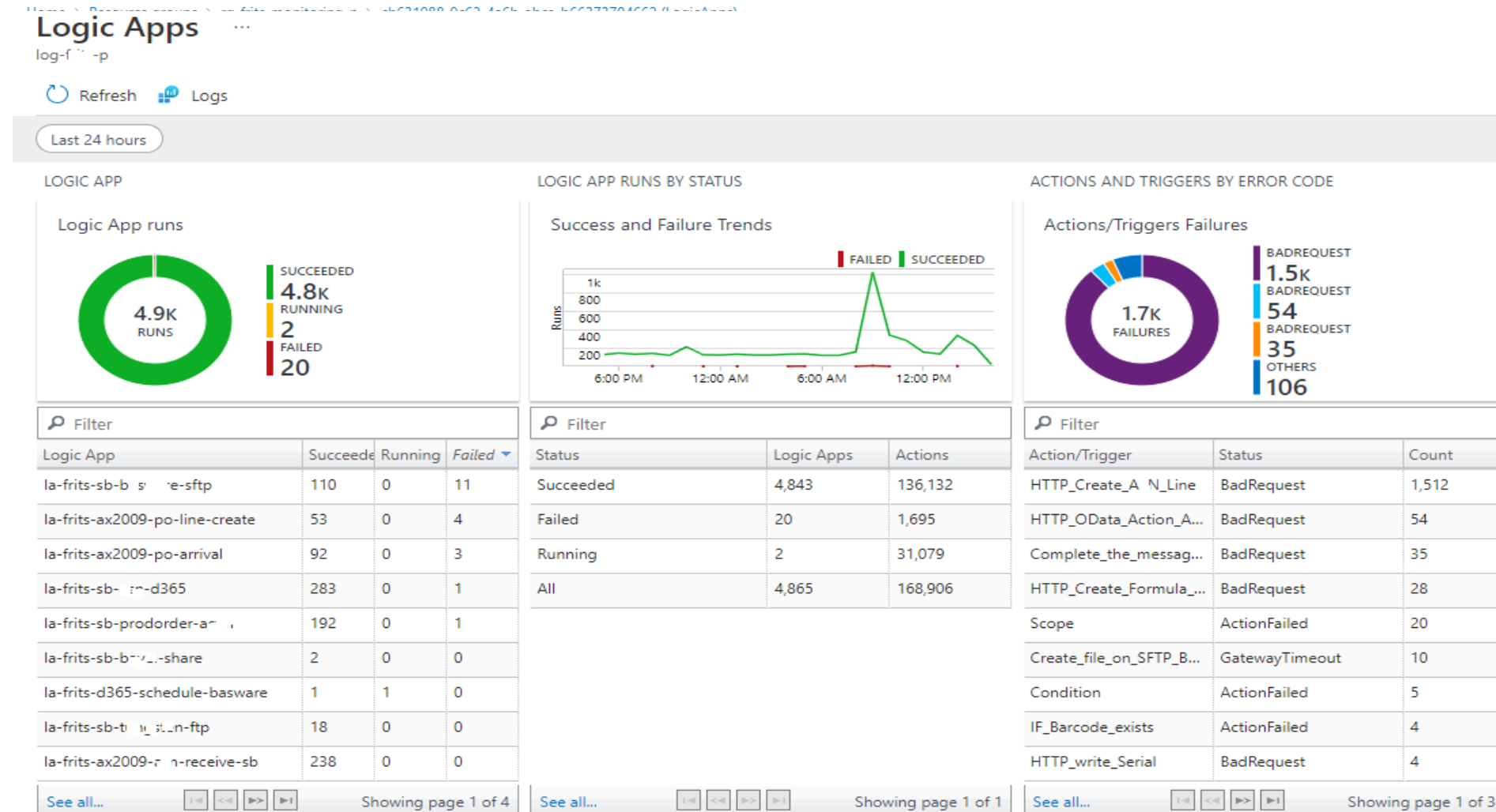
Overview Run history Trigger history Action required Favorite runs

	Status	Identifier
<input type="checkbox"/>	✖	08585470984328602313593677216CU95
<input type="checkbox"/>	✖	08585470995642750840784696610CU67
<input type="checkbox"/>	✖	08585471024581356725547753022CU69
<input type="checkbox"/>	✖	08585471027592406644999899006CU71
<input type="checkbox"/>	✖	08585471048880996493325302739CU63
<input type="checkbox"/>	✖	08585471073737775426027046145CU62
<input type="checkbox"/>	✖	08585471530280252200017932586CU71
<input type="checkbox"/>	✖	08585471561328815040304459641CU62
<input type="checkbox"/>	✖	08585471561570970869793080962CU213
<input type="checkbox"/>	✖	08585471562057245367071272718CU213

Create_file_on_SFTP_ - Logic App action

Summary	NA
Start date	06/06/2022 11:41:22
End date	06/06/2022 11:52:00
Status	Failed
Tracking id	08585470984328602314593677216CU68
Inputs	https://prod-210.westeurope.logic.azure.com:443/workflows/a53528e6dde549fba38c...
Outputs	https://prod-210.westeurope.logic.azure.com:443/workflows/a53528e6dde549fba38c...
Error	<pre>{ "code": 504, "source": "logic-apis-westeurope.azure-apim.net", "clientRequestId": "3b887f06-c540-426b-911a-b237ff511fd6", "message": "BadGateway", "innerError": { "status": 504,</pre>

Real-world Example



Hosting



On-premise or Azure (Cloud) option:

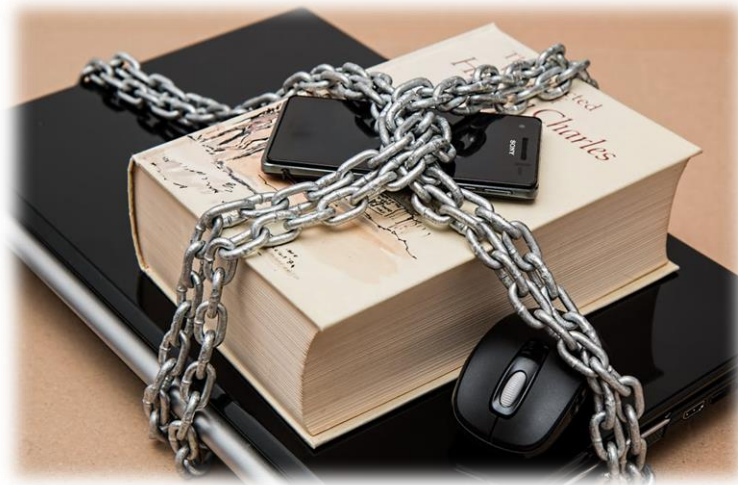
- **Cloud deployments** combine high availability, disaster recovery, sandbox environments, and application lifecycle management in a single offering with cloud-based systems of intelligence, infrastructure, compute, and database services
- **On-premise deployment** to leverage their existing data center investment, and data is bound to compliance rules (for instance, when there is no Azure Region/data center nearby)

Note: Updates and health monitoring in both deployment options are through Microsoft Dynamics [Lifecycle Services \(LCS\)](#), a cloud-based application lifecycle management service. It provides an environment and a set of regularly updated services to assist you in managing the application lifecycle of your Dynamics 365 Finance and Operations app implementations.

Security



- Use multiple Azure AD App/ Service accounts for integration
- Azure Key Vault storing app secrets, access keys, connection strings
- Networking options for file shares (accounts)
- Managed Identities



The logo for Kovai.co Integrate 2022. It features the text "kovai.co" in a sans-serif font, followed by "INTEGRATE" in a larger, bold, sans-serif font, and "2022" in the largest, bold, sans-serif font. A small rainbow-colored circle is positioned between "INTEGRATE" and "2022". The background of the logo is a collage of black and white photos of people, with a large white circle cutout in the center.

-
- The diagram illustrates the integration of Project X Documents with the D365 FSCM environment. On the left, a 'Team' is associated with 'Project X Documents' (represented by a green 'S' icon). This team is connected to 'Constoso Inc.' (represented by a blue 'C' icon). Within Constoso Inc., there are two main project areas: 'Team FSCM' and 'Team INT'. 'Team FSCM' is linked to 'Project D365 FSCM' (represented by a green checkmark icon), which in turn connects to 'Service Connections' (represented by a red 'S' icon). 'Team INT' is linked to 'Project Integrations' (represented by a red 'S' icon), which also connects to 'Service Connections'. The 'Service Connections' are used to establish connections with the D365 FSCM environment, which is divided into two sections: 'Dev/Test' and 'PROD'. Each section contains a yellow key icon, indicating a connection point. The 'Dev/Test' section is connected to the 'PROD' section via a dashed line. The 'Integrations' section (represented by a blue circle with a green arrow) is also connected to the 'PROD' section. The diagram shows how Project X Documents can be integrated with the D365 FSCM environment through these service connections and integrations.

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Governance



- Tagging integrations (each flow)
- Naming conventions
- Cost management
- Policies



Key Takeaways



- There are multiple ways to integrate; therefore, pick the right choice based on the **volume**!
- Think of supporting the integrations from the **start of the project**.
- Do **not overlook** governance and security aspects.
- Integration with D365 is **challenging**. Do not underestimate it.
- **Multiple skills** are required and the setup of a team.

Resources

- [Blogs](#) of my HSO colleague Poojith Jain
- Azure Integration Services [Website](#)
- Azure Architect Center – [Integration](#)
- D365 [Landing page](#)
- Serverless360 [Blog](#)
- [Serverless Notes](#)
- [MS Learn](#)
- And finally, my [blog](#)



Thanks

My **HSO** colleagues Harmen Klok and
Poojith Jain



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Y O U

