

# **BI4Dynamics Process Automation**

How to automatically update data from BC Cloud, Data Lake to Analysis Services

**BI server is On-Premises** 

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## **1** Process Automation #1 – Start Container Instance

### **1.1 Introduction**

This automation process is for an Azure Container instance (Docker), which is a light virtual machine, based on Bl4Dynamics image. These Container instances are used for running table export from BC to Blob storage. Through Logic apps docker will run on a scheduled day and time. Logic app will automatically start and terminate the docker after finishing the export.

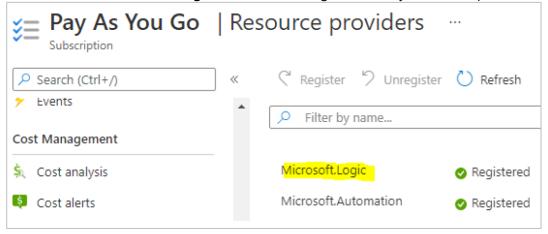
## **1.2 Prerequisite**

For this manual you will need a working Container instance, which exports table data from BC to Blob storage. Picture below shows Container instance settings made as per instructions of Bl4Dynamics in Bl4Dynamics Infrastructure Installation (Local server + Azure resources).

bi4dynamics-docker						
✓ Search (Ctrl+/) «	🕨 Start 🤇 Restart	🗌 Stop 📋 Delete 🖒 Refresh				
😵 Overview	↑ Essentials					
Activity log	Resource group (chang	e) : azure-development	OS type	: Windows		
Access control (IAM)	Status	: Succeeded	IP address (Public	):		
🗳 Tags	Location	: West Europe	FQDN	:		
- lags	Subscription (change)	: Pay-As-You-Go	Container count	:1		
Settings	Subscription ID	: 0edf89a6-c40e-475e-99db-92b04c				
Containers	Tags (change)	: Click here to add tags				

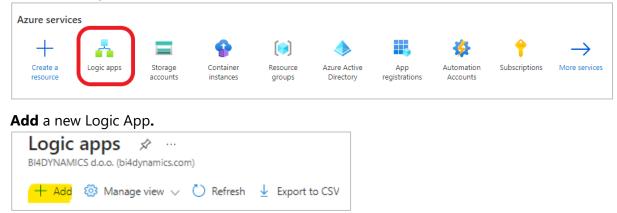
• Logic Apps (to be setup here).

Make sure that **Microsoft.Logic** resources are registered for your subscription.



## 1.3 Setup Logic App

#### Search for Logic Apps in Azure.

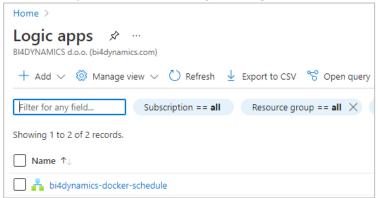


Enter **Subscription**, **Resource Group** and create a meaningful **Name** for your logic app. **Select** the Region and choose **Consumption** as a Plan type.

Click **Review + create** and select **Create** in the next window.

Create Logic App		
Basics Tags Review + create		
	orkflows as a logical unit for easier management, deployment and sharing business-critical apps and services with Azure Logic Apps, automating you ode.	
Project Details		
Select a subscription to manage deployed all your resources.	resources and costs. Use resource groups like folders to organize and man	nage
Subscription * ①	Pay-As-You-Go	$\sim$
Resource Group * ①	azure-docker Create new	$\sim$
Instance Details		
Logic App name *	bi4dynamics-docker-schedules	~
Region *	West Europe	$\sim$
Enable log analytics *	🔿 Yes 💿 No	
Plan		
	ur app scales, what features are enabled, and how it is priced. Learn more	
Plan type *	Standard: Best for enterprise-level, serverless applications, with event-based scaling and networking isolation.	
	<ul> <li>Consumption: Best for entry-level. Pay only as much as your workflow runs.</li> </ul>	
	O Looking for the classic consumption create experience? Click here	

Once deployment is complete, go to **Logic apps** and open the newly created application.



Logic apps designer will open with premade templates to use.

Select **Recurrence** in the template or search for it in the search dialog.

Home > Logic apps > bi4dynamics-docker-schedule >			
Logic Apps Designer			
	Introducing Azure Logic Ap		Building integration solutions is easi Lopic Apps brings speed and scalability The ease of use of the designer, variety o powerful management tools make centra businesses movel works digitalization. L and outling-edge systems together. - Create business processes and workd - Integrate with SaaS and enterprise a - Unlock value from on-premises and o
	Watch on Toulune		
	Start with a common trigger Pick from one of the most commonly used triggers, t	hen orchestrate any number of actions using the rich	collection of connectors
	When a message is received in a Service Bus queue	When a HTTP request is received	When a new tweet is posted
	6 Recurrence	When a new email is received in Outlook.com	When a new file is created on OneDrive
×			

Select the **Interval** and **Frequency** at which you decide the docker should be run.

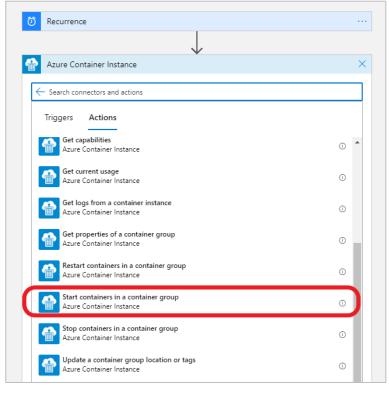
1		* Frequency Week	$\sim$
Time zone	(UTC) Coordinated Unive	rsal Time	$\checkmark$ ×
On these days	Monday		$\checkmark$ ×
At these hours	22		$\checkmark$ ×
At these minutes	0		×
Preview Runs at 22:00 on Mo	onday every week.		

**Note:** If the selected Frequency is **Week**, you can add new parameters which set the days, hours, and minutes when the Virtual Machine should start.

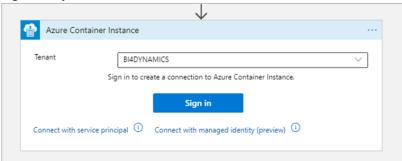
#### Click + New step, search for Azure Container instance and select it.

	$\square$		$\downarrow$		
T Choose	an operation				×
, ∕ azure co	ontainer				×
For You	All Built-ir	Standard	Enterprise	Custom	
Azure Blob Storage	Azure Container				

In the drop-down menu select Start containers in a container group.



#### Sign into your Tenant.



#### Enter your Subscription ID, Resource Group and Container Group Name (docker).

Start containe	rs in a container group	
*Subscription Id	Pay-As-You-Go	$\sim$
* Resource Group	azure-docker	~
*Container Group Name	bi4dynamics-docker	
Connected to jp@bi4	dynamics.com. Change connection.	

Click Save in the top left of the designer and press Run to test if the application is working correctly.

ÓF	Recurrence	Os
	$\downarrow$	
<b>A</b>	Start containers in a container group	2s

## 1.4 Test logic app

#### Go to Container instances.



Check the selected container instance (docker) if it is being **Created** or already **Running**.

bi4dynamics-docker Container instances	\$	
₽ Search (Ctrl+/) «	🕞 Start 🤇 Restart	🗌 Stop 📋 Delete 💍 Refresh
Overview	∧ Essentials	
Activity log	Resource group (change	e) : azure-development
Access control (IAM)	Status	: Running
🗳 Tags	Location	: West Europe
	Subscription (change)	: Pay-As-You-Go
Settings	Subscription ID	: 0edf89a6-c40e-475e-99db-92b04c
Containers	Tags (change)	: Click here to add tags

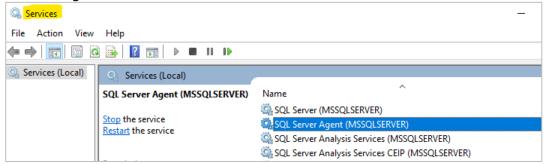
You have now successfully created and tested a logic app that automatically starts container instance at specific times.

## 2 Process Automation #3 – Start SQL server Agent (VM)

When Virtual machine is running, it is ready to process data. This process is triggered by SQL Server Agent feature, a part of SQL server.

## 2.1 Enable SQL Server agent

Go to **Services** and find the **SQL Server Agent** service. If you are using newly created Virtual Machine, it will probably be the only SQL Server Agent, but if you are running more SQL server engines, there may be more Agents.



Right click and select **Properties** and set Start-up Type to Automatic.

SQL Server Ag	jent (BC) Properties (Local Computer)	×
General Log Service name Display name Description: Path to exect "C:\Program Startup type: Service statu Start You can spec from here.	On Recovery Dependencies	
Service name	e: SQLAgent\$BC	
Display name	Log On       Recovery       Dependencies         e name:       SQL Agent SBC         e name:       SQL Server Agent (BC)         otion:       Executes jobs, monitors SQL Server, fires alerts, and allows automation of some administrative tasks.         o executable:       •         ogram Files\Microsoft SQL Server\MSSQL15.BC\MSSQL\Binn\SQL/         o type:       Automatic         e status:       Running         Start       Stop         an specify the start parameters that apply when you start the service are.         arameters:	
Description:		$\langle \rangle$
		ฉม
Display name:       SQL Server Agent (BC)         Description:       Executes jobs, monitors SQL Server, fires alert allows automation of some administrative tasks         Path to executable:       "C:\Program Files\Microsoft SQL Server\MSSQL15.BC\MSSQL\V         Startup type:       Automatic         Service status:       Running         Start       Stop       Pause         You can specify the start parameters that apply when you start the	Automatic	$\sim$
Service statu	Service name:       SQLAgentSEC         Display name:       SQL Server Agent (BC)         Description:       Executes jobs, monitors SQL Server, fires alerts, and allows automation of some administrative tasks.         Path to executable:       "C:\Program Files\Microsoft SQL Server\MSSQL15.BC\MSSQL\Binn\SQL/         Startup type:       Automatic         Service status:       Running         Start       Stop         You can specify the start parameters that apply when you start the service from here.	
Start	Stop Pause Resume	Recovery Dependencies     SQLAgent\$BC   SQL Server Agent (BC)   Executes jobs, monitors SQL Server, fires alerts, and allows automation of some administrative tasks.  Ilicrosoft SQL Server\MSSQL15.BC\MSSQL\Binn\SQL/   Automatic   Running   Stop   Pause   Resume   start parameters that apply when you start the service
	On       Recovery       Dependencies         e:       SQLAgentSBC         e:       SQL Server Agent (BC)         Executes jobs, monitors SQL Server, fires alerts, and allows automation of some administrative tasks.         utable:         Files\Microsoft SQL Server\MSSQL15.BC\MSSQL\Binn\SQL/         Automatic         s:       Running         Stop       Pause         Cify the start parameters that apply when you start the service	
Start parame	iters:	
	OK Cancel App	bly

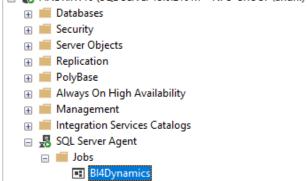
**Note:** make sure that user running service is a domain admin user (not a service) and has permissions needed to process data warehouse and analysis services. On VM this would be the VM admin user.

## 2.2 Setup SQL Server Agent

SQL Server agent conducts processing of stage, data warehouse and analytics, bringing new data to users. To set SQL Agent Job open *Process* tab, set SQL Agent Job frequency and press **Create**:

File 🔻 Deploy	y Process C	ustomize St	tage Install Cloud	ETL			
Edit SSIS	<ul><li>○ Full</li><li>● Incremental</li></ul>	Process	<ul> <li>☆ Stage</li> <li>➡ Data Warehouse</li> <li>➡ Analysis Database</li> </ul>	Full	Name: Start:	BI4Dynamics 13/04/2023 👸 th Daily - Create	Account schedules
rocess Flow SSIS	Update	Process All		Process one		SQL Agent Job	Extra

Open SQL Server Management Studio, navigate to **Properties** of the Agent Job that you have created.



### Press Schedules, click on Edit. Set properties for Job Agent and press OK.

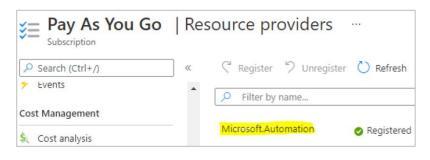
ielectapage ØGeneral	Job Schedule Prope	rties - BI4Dynamics Auto Process	Schedule		_		×
Steps Schedules	Name:	BI4Dynamics Auto Process Sche	dule		Jobs in S	Schedule	
Alerts	Schedule type:	Recurring		~	Enabled		
7 Targets	One-time occurrence —						
	Date:	13/04/2023 V Time:	15:12:25	A V			
	Frequency						
	Occurs:	Daily ~	]				
	Recurs every: Daily frequency	1 day(s)					
	Occurs once at:	08:00:00					
	Occurs every:	1 🔶 hour(s) 🗸	Starting at:	00:00:00	÷		
onnection	Duration		Ending at:	23:59:59	A V		
Gerver: NDRIIW10		14/04/2023	End date:	10/04/2	0000		
Connection: NPS-GROUP\andrii	Start date:	14/04/2023	<ul> <li>End date:</li> <li>No end date:</li> </ul>	13/04/2	2023 🔍 🔻		
View connection properties	Summary						
	Description:	Occurs every day at 08:00:00. S	chedule will be used :	starting on 14/04/	/2023.	^	]
ogress							
Ready				ОК	Cancel	Help	
							_

## 3 Process Automation #4 – Start and Stop Azure Analysis Services

This part of documentation is intended to explain the process of scheduling the work of Azure Analysis Services. It will allow the Analysis Services to start and stop on scheduled days and time based on the business requirements of the end-users.

### **3.1 Prerequisities**

- Azure Analysis Services: creation described in document "Application Installation (Azure VM)".
- Registered resource Microsoft.Automation for the subscription.

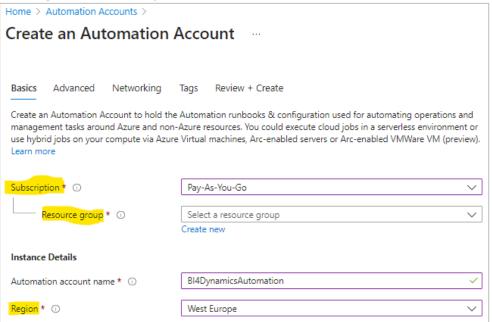


## 3.2 Instructions

Go to the Azure Portal and search for Automation Accounts:

Automation Account				×
All Services (17)	Documentation (99+)	Azure Active Directory (2)	Resources (0)	Resource Groups (0)
Marketplace (0)				
Services				See all
Automation Accounts		📑 Batch accounts		

Create a new Automation Account under the same Subscription and in the same Resource Group and Region as the Analysis Services:



### In the tab Advanced, select System Assigned Managed Identity:

Create an Automation Account				
Basics Advanced Networking Tags Review + Create				
Managed Identities				
Use Managed Identities as the recommended method for authenticating with Azure resources from the runbooks. Managed identity would be more secure than Runas account since it doesn't require any credentials to be stored. Learn more				
System assigned				
User assigned				

Once the Automation Account is created, go to Account Settings > Identity. In the tab System Assigned, make sure that the Status is set to On and click on Azure Role Assignments:

BI4DynamicsAut	toma	ation   Identity 🛧 …
Search	«	System assigned User assigned
<ul> <li>Python packages</li> <li>Credentials</li> </ul>		A system assigned managed identity is restricted to one per resource and is tied to the lifecycle on code. Learn more about Managed identities.
${\cal S}$ Connections		🔚 Save 🗙 Discard 🜔 Refresh   🖗 Got feedback?
📮 Certificates		
<i>fx</i> Variables		Status ①
Related Resources		Off On Object (principal) ID ①
🚇 Linked workspace		a1c30e3a-3c09-42a8-a33e-faa5397b8738
🥌 Event grid		Permissions ①
🧬 Start/Stop VM		Azure role assignments
Account Settings		

Add a new role assignment to the System Managed Identity:

Azure role assignments				
+ Add role assignment (Preview)	🕐 Refresh			
If this identity has role assignments th	nat you don't have permission to read, they won't be shown in the list. Learn more			

Under the option **Scope** select the option **Resource Group**.

Specify the **Subscription** and **Resource Group** in which Analysis Services are located. Under the option **Role** select **Contributor**.

Add role assignment (Preview)	×
Scope ①	
Resource group Subscription	~
Resource group ①	$\sim$
BI4Dynamics Role ①	$\sim$
Contributor ()	$\sim$
Learn more about RBAC	

Once role assignment is added, navigate to **Process Automation > Runbooks** and create a new one. Give to a new **Runbook** a meaningful name such as **Start\_Stop\_AAS**.

In the **Runbook Type** select the option **PowerShell**. In the **Runtime Version** select the option **5.1**.

🚦 Create a runbook	
Name * 🛈	Start_Stop_AAS 🗸
Runbook type * 🕡	PowerShell ~
Runtime version * ①	<u>51</u> ~
Description	
During runbook execution, PowerShe PowerShell modules are present in 5.	II modules targeting 5.1 runtime version will be used. Please make sure the required 1 runtime version.

**Important:** Different **Runtime** Version might lead to the error in the execution of the script. Syntax for authentication might differ between PowerShell versions.

Once the Runbook is created, you will be navigated to the edit view of the Runbook:

Start_Stop_AAS	
🔚 Save 🌐 Publish 🗙 Revert to published 🗠 Test pane 🔗 Feedback	
> CMDLETS	

Insert the following script to the command lines:

# Parameters

```
[CmdletBinding()]
param(
    [Parameter(Mandatory=$True,Position=0)]
    [ValidateSet('Start','Stop')]
    [string]$AasAction,
    [Parameter(Mandatory=$True,Position=1)]
    [ValidateLength(1,100)]
    [string]$ResourceGroupName,
    [Parameter(Mandatory=$True,Position=2)]
    [ValidateLength(1,100)]
    [string]$AnalysisServerName
# Keep track of time
$StartDate=(GET-DATE)
# Log in to Azure with AZ (standard code)
Write-Verbose -Message 'Connecting to Azure'
# Name of the Azure Run As connection
$ConnectionName = 'AzureRunAsConnection'
try {
        $AzureContext = (Connect-AzAccount -Identity).context
catch{
        Write-Output "There is no system-assigned user identity. Aborting.";
        exit
    }
# Getting the AAS for testing and logging purposes
$myAzureAnalysisServer = Get-AzAnalysisServicesServer -ResourceGroupName $ResourceGroupName -
Name $AnalysisServerName
if (!$myAzureAnalysisServer)
{
    Write-Error "$($AnalysisServerName) not found in $($ResourceGroupName)"
    return
}
else
{
    Write-Output "Current status of $($AnalysisServerName): $($myAzureAnalysisServer.State)"
# Check for incompatible actions
if (($AasAction -eq "Start" -And $myAzureAnalysisServer.State -eq "Succeeded") -Or ($AasAction -
eq "Stop" -And $myAzureAnalysisServer.State -eq "Paused"))
    Write-
Error "Cannot $($AasAction) $($AnalysisServerName) while the status is $($myAzureAnalysisServer.State
)"
    return
# Resume Azure Analysis Services
elseif ($AasAction -eq "Start")
    Write-Output "Now starting $($AnalysisServerName)"
    $null = Resume-AzAnalysisServicesServer -ResourceGroupName $ResourceGroupName -
Name $AnalysisServerName
}
# Pause Azure Analysis Services
else
ł
   Write-Output "Now stopping $($AnalysisServerName)"
    $null = Suspend-AzAnalysisServicesServer -ResourceGroupName $ResourceGroupName -
Name $AnalysisServerName
# Show when finished
$Duration = NEW-TIMESPAN -Start $StartDate -End (GET-DATE)
Write-
Output "Done in $([int]$Duration.TotalMinutes) minute(s) and $([int]$Duration.Seconds) second(s)"
```

After that got to the **Test Pane** and fill in the required parameters:

- Under the option **AASACTION** write **Start** (if the Analysis Services are turned on **Stop**).
- Under the option **RESOURCEGROUPNAME** insert the name of the **Resource Group**.
- Under the option ANALYSISSERVERNAME insert the name of Azure Analysis Services.

Once the parameters are inserted, click on Start:

<mark> 🖒 Start</mark> 🗌 Stop 🛛 Suspend 🤇 F	Resume 🕚 View last test 💍 Refresh job streams
Parameters	
AASACTION * ①	Click 'Start' to begin the test run.
Enter a value	Streams will display when the test completes.
Mandatory, String	
RESOURCEGROUPNAME * ① Enter a value	
Mandatory, String	
ANALYSISSERVERNAME * ①	
Enter a value	
Mandatory, String	

Once the command was executed successfully, go to the Edit panel, Save and Publish the runbook:

Edit PowerShell Run Start_Stop_AAS	book* …
🔜 Save 🜐 Publish 🗙 Revert to pub	ished ∠ Test pane 🔗 Feedback
> 💀 CMDLETS	2 [CmdletBinding()]
	2 [CindletBinding()] 3 param(
> A RUNBOOKS	
	4 [Parameter(Mandatory=\$True,Position=0)
	<pre>5 [ValidateSet('Start','Stop')]</pre>
> 🚔 ASSETS	6 [string]\$AasAction,
	7

Once it is published, click on the option **Link to the schedule.** There you will need to set up the schedule and parameters for the Runbook Execution:

Schedule Runbook 🖈 …	
Schedule Link a schedule to your runbook	
Parameters and run settings	
Configure parameters and run settings	

Parameters and run settings for the schedule should be configured similarly to the previous step. Only **AASACTION** will differ based on the command of the schedule (Start or Stop).

#### Note:

The automation schedules for Start and Stop commands must be created separately.

In the schedule settings provide a name to the new schedule. We suggest giving it a name corresponding to the executed command (Start or Stop). Also, you can provide additional details in the Description.

#### Important:

Do not forget to specify the correct **Time Zone** according to which the time of automation will be scheduled.

As a next step, change **Recurrence** from Once to Recurring and set up **Recur every** option to once a Day or Week. In case of week, the schedule can be set up at the specific days of the week so that Saturday and Sunday could be excluded from the automation as on the screenshot on the right.

The final schedules should look as following:

+ Add	a schedule 🛛 🔗 Feedback	🕐 Refresh	
Name	Next run	Time zone	Status
Start	4/12/2023, 7:00 AM	Central European Time	√ On
Stop	4/12/2023, 5:00 PM	Central European Time	√ On

### New Schedule $\times$ Name \* Start $\checkmark$ Description Starts the AAS at 7:00 (UTC +2) Starts \* 🕕 04/12/2023 7:00 AM Time zone Slovenia - Central European Time $\sim$ Recurrence Once Recurring Recur every \* ① Week 1 $\sim$ On these days ① Monday 🗹 Tuesday Wednesday Thursday Friday Saturday Sunday Set expiration Yes No

#### The execution of the schedules can be monitored in the **Process Automation > Jobs** tab:

	ks Status : All	Time span : All		
Runbook	Job created	Status	Ran on	Last status update
Start_Stop_AS	4/11/2023, 6:00:17 AM	✓ Completed	Azure	4/11/2023, 6:03:12 AM
Start_Stop_AS	4/10/2023, 6:00:17 PM	Completed	Azure	4/10/2023, 6:01:52 PM
Start_Stop_AS	4/10/2023, 6:00:30 AM	✓ Completed	Azure	4/10/2023, 6:03:53 AM
Start_Stop_AS	4/9/2023, 6:00:21 PM	✓ Completed	Azure	4/9/2023, 6:03:31 PM
Start_Stop_AS	4/9/2023, 6:00:20 AM	✓ Completed	Azure	4/9/2023, 6:04:04 AM

## **4 Process Automation - Timing Schedule**

Here is an example of processing schedule for daily update:

Step	Step description	Start Time	Duration	Comment
1	Start Container instance	22:00	45 min	BC export to data lake can run anytime after BC users are finishing their daily work. This process time can vary 30% (!) day by day, exporting same amount of data, in the after- office hours when no-one is using BC.
				Keep enough buffer time for next step.
2	Start Azure Analysis Services	07:00	2-3 min	Azure AS must be ready when DW processing start
3	Start SQL Server Agent	07:15	20 min	DW processing (data are in Azure AS)
4	Stop Azure Analysis Services	17:00		AAS will run during business hours when users are querying data.