



# **Corticon Tutorial**

## **Batch Processsing**



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# Table of Contents

Batch processing in Corticon.....7



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# Batch processing in Corticon

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Corticon Decision Services can process very large datasets efficiently by using the Corticon Advanced Data Connector and batch processing capabilities in the Corticon Web Console. Corticon Studio includes the Batch Processing sample which provides a completed project demonstrating batch processing. This tutorial dives deeper, providing you step-by-step instructions for taking an ADC enabled decision service and using it for batch processing.

Requirements:

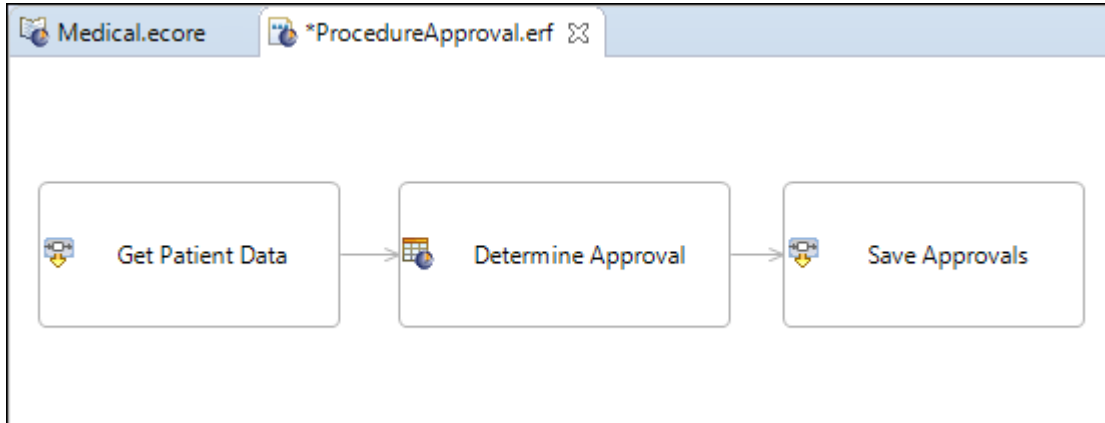
- Install Corticon Studio, Corticon Server, and Corticon Web Console.
- A supported database. This tutorial assumes MS SQL Server. (Several other databases can be used.)

## Use the sample project

To get started, use the ADC Database Connectivity sample included in the Corticon Studio installation. The Ruleflow in the sample project has three steps:

1. ADC is used to retrieve the information for one or more patients and procedures they received from a database.
2. Rules execute to determine if a procedure is approved.
3. ADC writes the approval status for each procedure back to the database.

The project's Ruleflow illustrates the steps:



The Ruleflow operates on a set of input patient IDs. This is essential to understanding batch processing. Corticon Server's batch processing capability will be used to retrieve "batches" of patient IDs from the database, and then ADC will efficiently retrieve the information for these patients, apply rules, and then store the results back into the database. The efficiency is realized in the minimizing of the number of database queries: retrieving the information for 1000 patients with one query is much more efficient than a thousand separate queries.

This tutorial focuses only on taking this sample and using it with batch processing. For details on ADC, see *"Getting Started with ADC" and "Advanced ADC Topics" in the Corticon Data Integration Guide*.

### Install the sample

1. In Corticon Studio, select **Help -> Samples**.
2. Scroll to the **Advanced** section on the left-side of the screen. Click **ADC Database Connectivity**, and then click **Open**.
3. Choose the **ADC Database Connectivity** option, and then click **OK**.

The ADC Database Connectivity project is imported, and displayed in the Project Explorer window.

### Set up the database

1. Create a database named **PatientRecords** in a database Corticon can access. You will need write access to this database to complete the tutorial.
2. Expand the ADC Database Connectivity project, and then locate the **adc** and **patient** SQL scripts for the appropriate database product.
3. Execute the scripts in the database management tool's editor. The scripts create **ADC**, **Batch**, **Patient** and **Treatment** tables in the **PatientRecords** database, and then update the tables with data.

### Configure ADC for your database

1. Test your database connection in Studio by opening the project's Vocabulary, `Medical.ecore`, and then updating the connectivity tabs for **Query** and **Patient Data**.



Medical.ecore

Datasource: Patient Data

Medical

- Patient
- Treatment

Custom Data Types Query Patient Data

METADATA MAPPING CONNECTION DATASOURCE

Import Clear Clear Test Delete

Datasource Name: Patient Data

Description:

Database Server: Microsoft SQL Server

URL: jdbc:progress:sqlserver://localhost:1433;databaseName=PatientRecords

Authentication: Basic

Username: sa

Password: \*\*\*\*\*

Catalog Filter:

Schema Filter:

2. In each tab, select the appropriate Database Server, and then enter its URL, and authentication values.
3. Click **CONNECTION Test** to validate the connection.
4. On the **Vocabulary** menu, select **Datasource Configuration File > Export**. Save the configuration file as `PatientApprovalConfiguration.xml` at a location that it will be accessible to the Corticon Server installation that will be servicing the batch processing.

## Test the ruleflow

1. Open the sample's Ruletest, `ProcedureApproval.ert`.
2. Execute the **No Input Data** Testsheet. You should see the following output:

Input	Output	Expected
	<ul style="list-style-type: none"> <li>▼ Patient [1] <ul style="list-style-type: none"> <li>dob [09/23/72 12:00:00 AM]</li> <li>gender [F]</li> <li>patientId [1]</li> <li>patientName [Teri Rivera]</li> <li>region [NE]</li> <li>▼ treatment (Treatment) [1] <ul style="list-style-type: none"> <li>approved [false]</li> <li>medicalCode [9WB8XDZ]</li> <li>patientId [1]</li> <li>providerId [1234]</li> <li>treatmentDate [07/15/17]</li> <li>treatmentId [1]</li> </ul> </li> <li>▼ treatment (Treatment) [8] <ul style="list-style-type: none"> <li>approved [true]</li> <li>medicalCode [BL30ZZZ]</li> <li>patientId [1]</li> <li>providerId [4321]</li> <li>treatmentDate [06/12/17]</li> <li>treatmentId [8]</li> </ul> </li> <li>▼ treatment (Treatment) [18] <ul style="list-style-type: none"> <li>approved [true]</li> <li>medicalCode [BD41ZZZ]</li> <li>patientId [1]</li> <li>providerId [1234]</li> <li>treatmentDate [08/12/17]</li> <li>treatmentId [18]</li> </ul> </li> </ul> </li> <li>▼ Patient [2] <ul style="list-style-type: none"> <li>dob [03/17/64 12:00:00 AM]</li> </ul> </li> </ul>	

When you see this output when running the ruletest, your ruleflow is functioning properly. It is ready to be deployed to Corticon Server and used in batch processing.

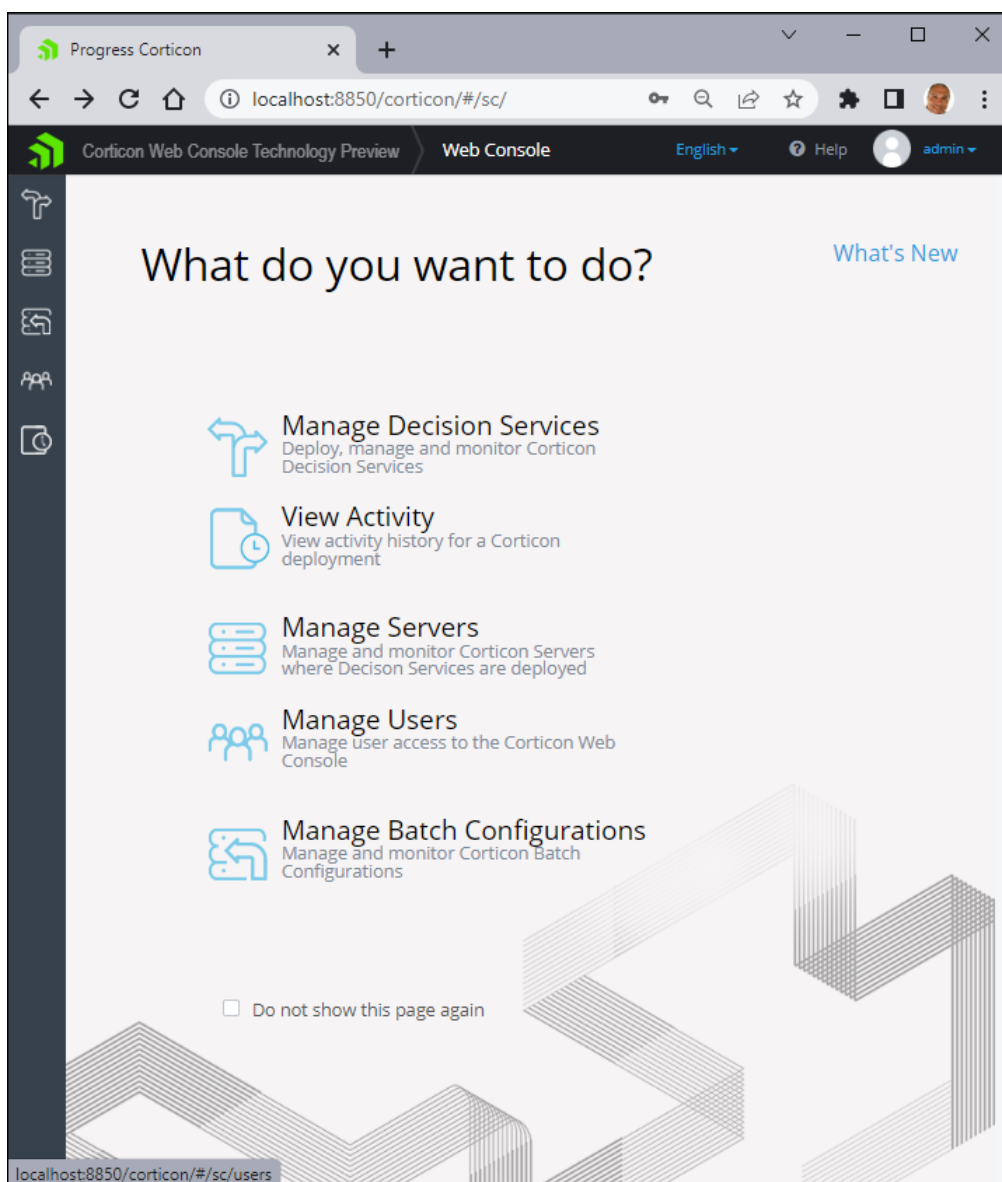
## Package the decision service

1. In the Project Explorer, right-click on the **ADC Database Connectivity** project.
2. Choose **Package and Deploy Decision Services**, and then choose **Package and save for later deployment**. Click **Next**.
3. Select the `ProcedureApproval` ruleflow.
4. Choose a directory that will be accessible by the Server, and then click **Finish**.

Your Decision Service is now ready to deploy.

## Deploy the Decision Service

1. Start Corticon Server.
2. Connect to Corticon Web Console from your browser using the default credentials **Admin/Admin**. The typical address for the Web Console is `http://localhost:8850/corticon` (use your appropriate host name and port number ). The Web Console opens



3. Click **Manage Decision Services**, and then click **Add Decision Service**.
4. Select **Add a single Decision Service**, and then click **OK**.
5. In the **Add Decision Service** dialog, enter:
  - a. Name: **MyADC\_Sample**
  - b. Description: **Deploys ADC Database Connectivity sample project's Decision Service**.
  - c. EDS File: navigate to the **ProcedureApproval.eds** file you created, and then select it.
  - d. Servers: Select the server location; typically, **local server**.
  - e. The completed Decision Service tab looks like this:

Add Decision Service

Decision Service

DataSource

Advanced

When adding a Decision Service you must specify a name, select a server and provide the EDS file of the Decision Service. Other properties are optional. To add the Decision Service to an existing Application select "**Add to an Existing Application**"

**Name**

MyADC\_Sample

**Description**

Deploys ADC Database Connectivity sample project's Decision Service.

**EDS File** [Choose File...](#)

ProcedureApproval\_v1\_0.eds

**Servers**

local server ▾

☐ **Add to an Existing Application**

Save

Save & Deploy

Cancel

- f. Click the **Database** tab, and then choose the **Datasource Configuration File** you exported from Corticon Studio.
- g. Click **Save and Deploy**. The completed Datasource tab looks like this:

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Decision Service

DataSource

Advanced

If this Decision Service connects to a database you must provide a Datasource Configuration file with connection parameters.

Datasource Configuration File [Choose File...](#)

PatientApprovalConfiguration.xml

If this Decision Service uses Corticon EDC to connect to a database you must select a EDC Access Mode of Read Only or Read/Update.

EDC Access Mode

☒ None ☐ Read Only ☐ Read/Update

Save

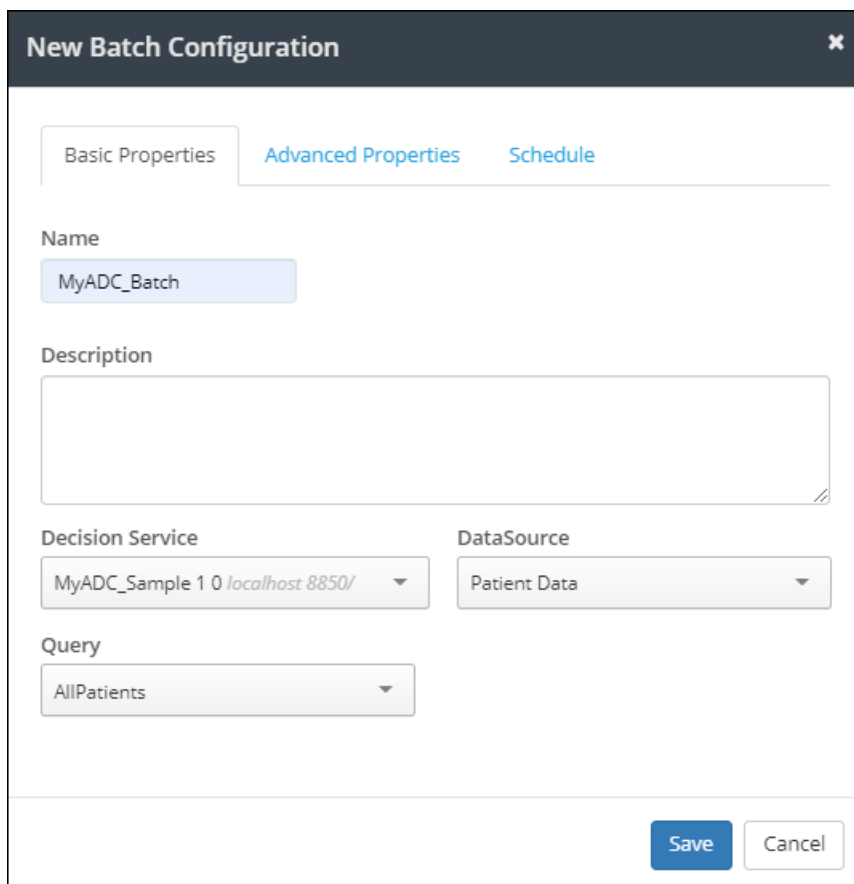
Save & Deploy

Cancel

The Web Console displays the Decision Service.

## Create a batch configuration

1. Select **Batch Configuration** on the left side of the Web Console.
2. Click **New Batch Configuration**.
3. In the **New Batch Configuration** dialog, enter:
  - a. Enter **MyADC\_Batch** for the Batch Configuration Name.
  - b. Choose Select Decision Service, and then choose **MyADC\_Sample 1.0**.
  - c. Choose the Datasource **Patient Data**.
  - d. Choose the Query **AllPatients**.
  - e. The Batch Configuration looks like this:



The image shows a 'New Batch Configuration' dialog box with a dark header bar containing the title and a close button. Below the header are three tabs: 'Basic Properties' (selected), 'Advanced Properties', and 'Schedule'. The 'Basic Properties' tab contains the following fields: a 'Name' field with the value 'MyADC\_Batch', a 'Description' text area, a 'Decision Service' dropdown menu with the value 'MyADC\_Sample 1 0 localhost 8850/', a 'DataSource' dropdown menu with the value 'Patient Data', and a 'Query' dropdown menu with the value 'AllPatients'. At the bottom right of the dialog are 'Save' and 'Cancel' buttons.

Click **Save**.

The Batch Configuration panel displays the new configuration.

## Run a batch job

1. On the **Batch Configuration: MyADC\_Batch** page, click **Execute** to run the batch process.
2. After execution, the Process Count shows as 10 on the **Batch Configuration: myADC\_Batch** page:



Databases

System Databases

CMSDetail

PatientRecords

Database Diagrams

Tables

System Tables

FileTables

dbo.CORTICON

dbo.CORTICON

dbo.CORTICON

dbo.CORTICON

dbo.CORTICON

dbo.Patient

dbo.Treatment

Columns

Keys

Constraints

Triggers

Indexes

Statistics

Views

Synonyms

Programmability

Service Broker

Storage

Security

	treatmentId	approved	medicalCode	providerId	treatmentDate	patientId
▶	1	False	9WB8XDZ	1234	2017-07-15	1
	2	True	BL30Y0Z	5678	2017-08-01	4
	3	False	9WB8XKZ	5678	2017-03-12	2
	4	False	F09Z1ZZ	1234	2017-07-01	6
	5	False	0313090	4321	2017-09-05	7
	6	False	F09Z0KZ	1234	2017-09-28	2
	7	True	BD41ZZZ	1234	2017-08-03	3
	8	True	BL30ZZZ	4321	2017-06-12	1
	9	True	B512ZZZ	8765	2017-10-30	8
	10	False	F09Z0KZ	4321	2017-10-04	7
	11	True	BD41ZZZ	4321	2017-08-15	6
	12	False	F09Z1ZZ	1234	2017-08-13	9
	13	False	F09Z1ZZ	5678	2017-09-23	7
	14	False	0313090	8765	2017-09-01	3
	15	True	BL30ZZZ	1234	2017-08-26	2
	16	False	9WB8XKZ	5678	2017-08-26	4
	17	False	9WB8XDZ	5678	2017-09-19	6
	18	True	BD41ZZZ	1234	2017-08-12	1
	19	False	F09Z1ZZ	8765	2017-07-30	3
	20	False	9WB8XKZ	1234	2017-07-19	8
*	NULL	NULL	NULL	NULL	NULL	NULL

## Run a Parameterized Batch Job

You can set your batch configuration with query parameters for more control. To try it out:

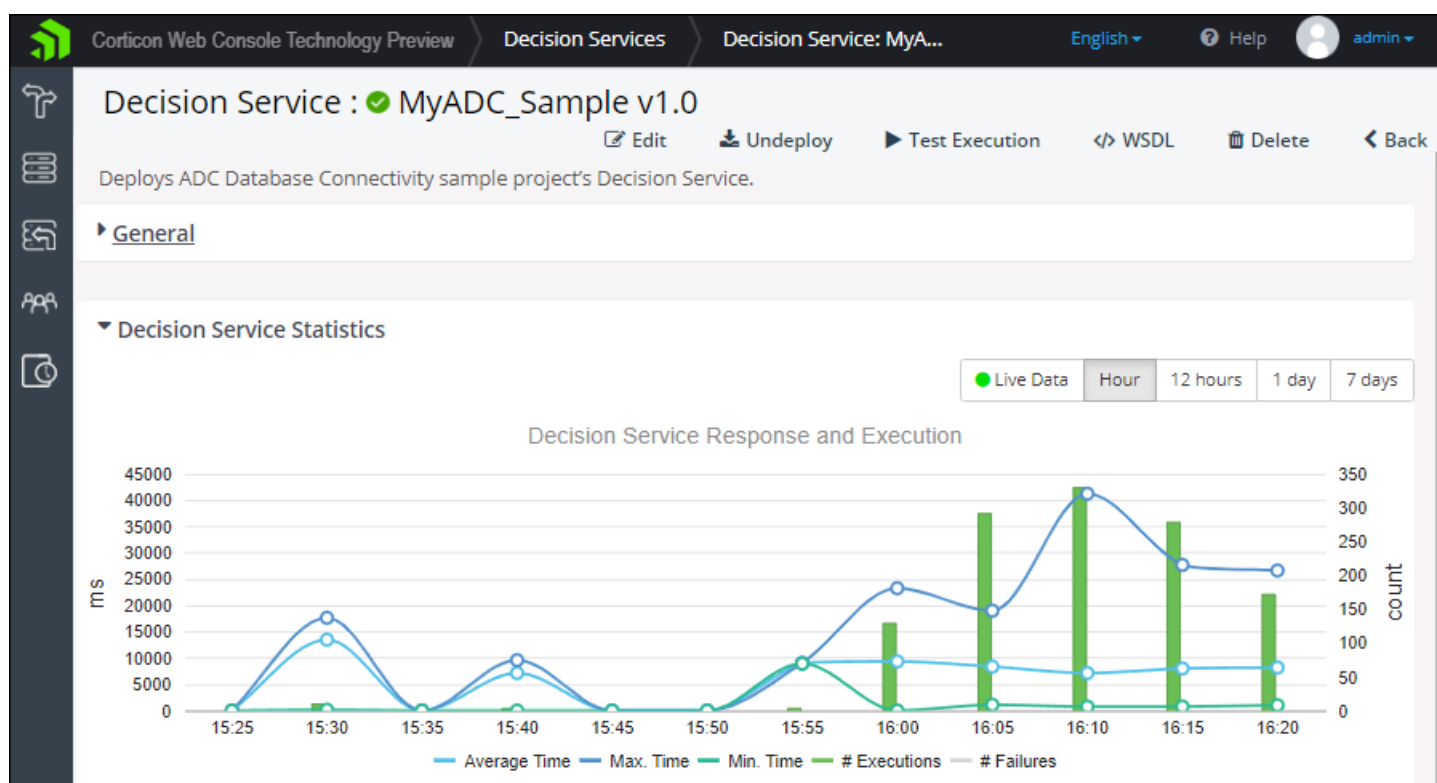
1. Select the **MyADC\_Sample 1.0** Decision Service.
2. Choose the **Patient Data** datasource.
3. Select **PatientsByRegion** for the query, which will add fields under Query Parameters.
4. Enter **NE** for the region value, and then click **Save**.
5. Execute the **MyADC\_Batch\_regional** job. Only the four patients from the NE region are processed in the Treatment table of the PatientRecords database.

## Run a Large Batch Test

The scripts from the Batch Rule Processing sample can be used to run large amounts of data through a Decision Service at one time. To test this out, a batch utility script generates patient records into the database. The example adds a thousand more records.

1. In the Corticon Studio's Project Explorer window, locate the **Batch Rule Processing** sample's SQL for your database, choose the **generate\_patients** script, and then open it in a database management tool.
2. Execute the script in the database. The database table expands to 1000 records.
3. In the Web Console, choose the Batch Configuration **MyADC\_Batch**, and then click **Execute**. While you have 1000 patients, only 171 of them are in the NE region.
4. Edit the **Batch** configuration to set the Query to **AllPatients**. Save it and then click **Execute**. All 1000 records are processed.
5. When the job is done, open the **Decision Service** panel in the Web Console to see the updated counters and charts:





You have successfully completed the Batch Processing tutorial!

1. You defined the Decision Service and its Datasource Configuration for where you set up the database.
2. You ran the Web Console to set up the Decision Service, and then created the batch configuration.
3. You executed the batch process and then modified the configuration to filter for a subset of the records.
4. You expanded the database to have a much larger number of records such that when you ran the batch again, it applied to only the filtered records.
5. You removed the filter so that all records were processed.
6. You then reviewed the processing statistics.

You can customize the process for your own data to take advantage of Corticon's powerful batch processing capability.

For more about batch processing, see:

- *"Batch Configurations" in the Web Console Guide.*
- *"Getting Started with Batch" in the Data Integration Guide.*

