Return output from custom activity

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Issue

Customers want to return output from custom activity, access it as runtime metadata from other downstream activities, and see it in monitoring and diagnostics logs

Resolution

Custom activity originally only supported console output and error spew to blobs, with just the blob paths visible in the activity output. SME MinhDo recently added a feature that allows custom activities to write JSON output to an "outputs.json" file in the same folder as the custom activity executable, and ADF makes the deserialized contents available in the activity's output.customOutput property, where it can be accessed from downstream activities at runtime as well as showing up in ADF monitoring output and in AzMon diagnostics logs. The documentation has been updated with this section: https://docs.microsoft.com/en-us/azure/data-factory/transform-data-using-dotnet-custom-activity#retrieve-execution-outputs, however some customers may miss it. Here's some more context:

The original outputs array with blob paths to stdout.txt and stderr.txt are primarily intended to help customers troubleshoot issues with their own custom activity code. Those paths are written to the same storage account used by the customer's batch pool, and customers are responsible for getting access to those blobs to view their contents as needed. A few customers followed a stylized pattern of writing json to stdout.txt, accessing the path from custom activity outputs, parsing the path and passing the relevant parts to a dataset over the storage linked service, and using a lookup activity to read the json later in the pipeline, as a very cumbersome workaround before we added outputs.json. That kind of workaround is no longer necessary or advisable.

Here are some more details about reading extended properties and writing outputs.json. In this example, the custom activity will be passed an extended property named testExtendedProperty. It retrieves the value of that property and includes it in a simple object written to the outputs.json file, which is then available in the custom activity's output.customOutput property.

In custom activity settings extended properties, the value of testExtendedProperty is "expected value".

Excerpt from custom activity (exe written in C#, using Newtonsoft.Json and System.IO):

```
dynamic activity = JsonConvert.DeserializeObject(File.ReadAllText("activity.json"));
string testValue = activity.typeProperties.extendedProperties.testExtendedProperty;
Console.WriteLine("Extended property testExtendedProperty value: {0}", testValue);
string outputsJson = string.Format("{0}{1}{2}",
  "{ \"greeting\": \"Received testExtendedProperty: ",
  testValue,
```

```
            "\" }");
        File.WriteAllText("outputs.json", outputsJson);
```

Contents of outputs.json: { "greeting": "Received testExtendedProperty: expected value" }

Monitoring activity run output for custom activity, some irrelevant parts redacted, relevant part in **bold:**

```
{
   "exitcode": 0,
   "outputs": [
      "https://redacted.blob.core.windows.net/adfjobs/0a7f7320-77fa-4556-bfca-e57cbeebe009/output/stdout.txt",
      "https://redacted.blob.core.windows.net/adfjobs/0a7f7320-77fa-4556-bfca-e57cbeebe009/output/stderr.txt"
   ],
   "customOutput": {
      "greeting": "Received testExtendedProperty: expected value"
   },
   "computeInformation": "
{\"account\":\"redacted\",\"poolName\":\"examplepool\",\"vmSize\":\"small\"}",
   "effectiveIntegrationRuntime": "DefaultIntegrationRuntime (West Central US)",
   "executionDuration": 21024
}
```

Body of a web activity that depends on the custom activity (which is called CustomBatchTest) and, along with a couple other properties, uses the custom activity output.customOutput in the value of the message property, relevant part in **bold:**

```
{"message":
{"value":"@{activity('CustomBatchTest').output.customOutput.greeting}","type":"Expression"},"runId":
{"value":"@pipeline().RunId","type":"Expression"},"preferSuccess":true}
```

Monitoring activity run input for that web activity, showing the runtime value from the custom activity output, some irrelevant parts redacted, relevant parts in **bold:**

```
{
   "url": "redacted",
   "method": "POST",
   "headers": {
      "Content-Type": "application/json"
   },
   "body": {
      "message": "Received testExtendedProperty: expected value",
      "runId": "13f5d9bb-862c-4f49-ba52-6a1663653a6e",
      "preferSuccess": true
   }
}
```

Additional Information:

- **Icm References:**
- **Author:** arthurw
- **Reviewer:** vimals
- **Keywords:**

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