Overview

This section contains the following topics:

Overview

Workflow Adapters are tools that allow a workflow to interact with systems outside the CWM. You can see them as agents and intermediaries between the CWM platform and any external services. Their role is to cause an action in an outside system that's part of a workflow stream, or to retrieve data required by a workflow to progress.

Every adapter is developed for communicating with an intended target service. Target services can be generic, such as REST APIs over HTTP, or specific, such as vendor products (Cisco's Network Services Orchestrator, for example).

If a workflow needs to access one or more external services, you can develop custom adapters for each of them using the **Adapter SDK**. You may also want to use two pre-built adapters which are available as part of the CWM offering. These ready-made solutions include: the Network Services Orchestrator adapter and a generic REST API adapter.

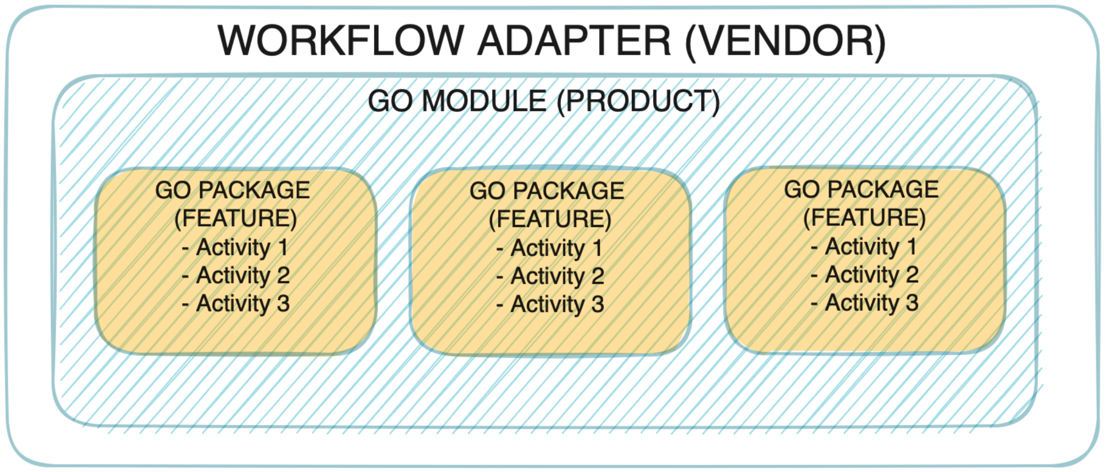
What's in an adapter

An adapter is developed using the Workflow Adapter SDK which uses Golang for defining adapter logic and leverages Protocol Buffers for representing adapter interfaces.

Modules, packages, activities

Every adapter is a **go module** that represents a product by a vendor. The **go module** in turn is a collection of product features organized into **go packages**. Inside the packages you define adapter activities, which are particular actions that the adapter can trigger within a given external system. You can have multiple features inside one adapter by bundling related activities into separate packages.

Figure 1: Adapter structure


WORKFLOW ADAPTER (VENDOR)
GO MODULE (PRODUCT)
GO PACKAGE (FEATURE) - Activity 1 - Activity 2 - Activity 3
GO PACKAGE (FEATURE) - Activity 1 - Activity 2 - Activity 3
GO PACKAGE (FEATURE) - Activity 1 - Activity 2 - Activity 3

As shown in the picture, every adapter follows the vendor, product and feature naming convention which corresponds to a standard **go** project layout with modules and packages as described above.

Interfaces

Each product feature is represented by a protobuf file located in the `proto` folder. The Adapter SDK provides command arguments to create the adapter structure and files.

As mentioned before, the naming convention for the adapter features is `<vendor>.<product>.<feature>`, for example, `cisco.nso.restconf`.

When you create an adapter, the Adapter SDK generates a `.proto` file for each interface (feature) you specified:

```
syntax = "proto3";

package <vendor>.<product>.<feature>;

option go_package = "<module>/<feature>";
```

The interface is defined as a list of RPCs in the service named 'Activities':

```
service Activities {
    rpc <ActOne> (<ActOne>Request) returns (<ActOne>Response);
    rpc <ActTwo> (<ActTwo>Request) returns (<ActTwo>Response);
}
```

Lastly, the input and output of each activity are defined as protobuf messages:

```
message <ActOne>Request {
    ...
}
message <ActOne>Response {
    ...
}
...
```

common.adapter.proto

Besides the `.proto` files representing the adapter interface, there is one additional file: `<vendor>.<product>.common.adapter.proto`.

The *common* `.proto` file is used to define additional configuration required by the adapter as well as information allowing the adapter to connect to a target system. The file is generated automatically by the Adapter SDK, but the developer can do any manual updates required.

Note The *common* `.proto` file must define certain messages to enable the CWM Resource Manager to handle this data correctly. This can be done directly inside the file (default) or by importing another `.proto`.

```
// Can be defined anywhere and imported to common .proto file.
message Resource {
    ...
}
message Secret {
    ...
}

// Must be defined in common .proto file.
message Config {
    Resource resource = 1;
    Secret   secret   = 2;
}
```

Activities

The Adapter SDK generates activities to be implemented in Golang. Each activity is represented as a method with the receiver being a pointer to an adapter struct. Each method definition is based on the activity RPC defined in proto.

```
func (adp *Adapter) <ActivityName>(
        ctx context.Context,
        req *<ActivityName>Request,
        cfg *common.Config) (*<ActivityName>Response, error) {
    /* Activity implementation */
}
```

Note There are no restrictions on how to implement an activity. The developer is free to import any available go packages. One suggestion is to avoid panics by having robust error handling with the activity returning a meaningful error code.

Properties

Each adapter has a `.properties` file which serves the CWM as the source of basic data about the adapter. Mandatory properties are described below with examples:

Property	Description
author=cisco	Name of adapter developer
vendor=cisco	Name of target system vendor
product=nso	Name of target system
version=1.0.0	Adapter version

Property	Description
cwmsdk=1.0.0	Version of SDK used for developing the adapter
cwmversion=1.0	Compatible CWM version
resourcetype=cisco.nso.resource.v1.0.0	Compatible resource type stored by CWM Resource Manager