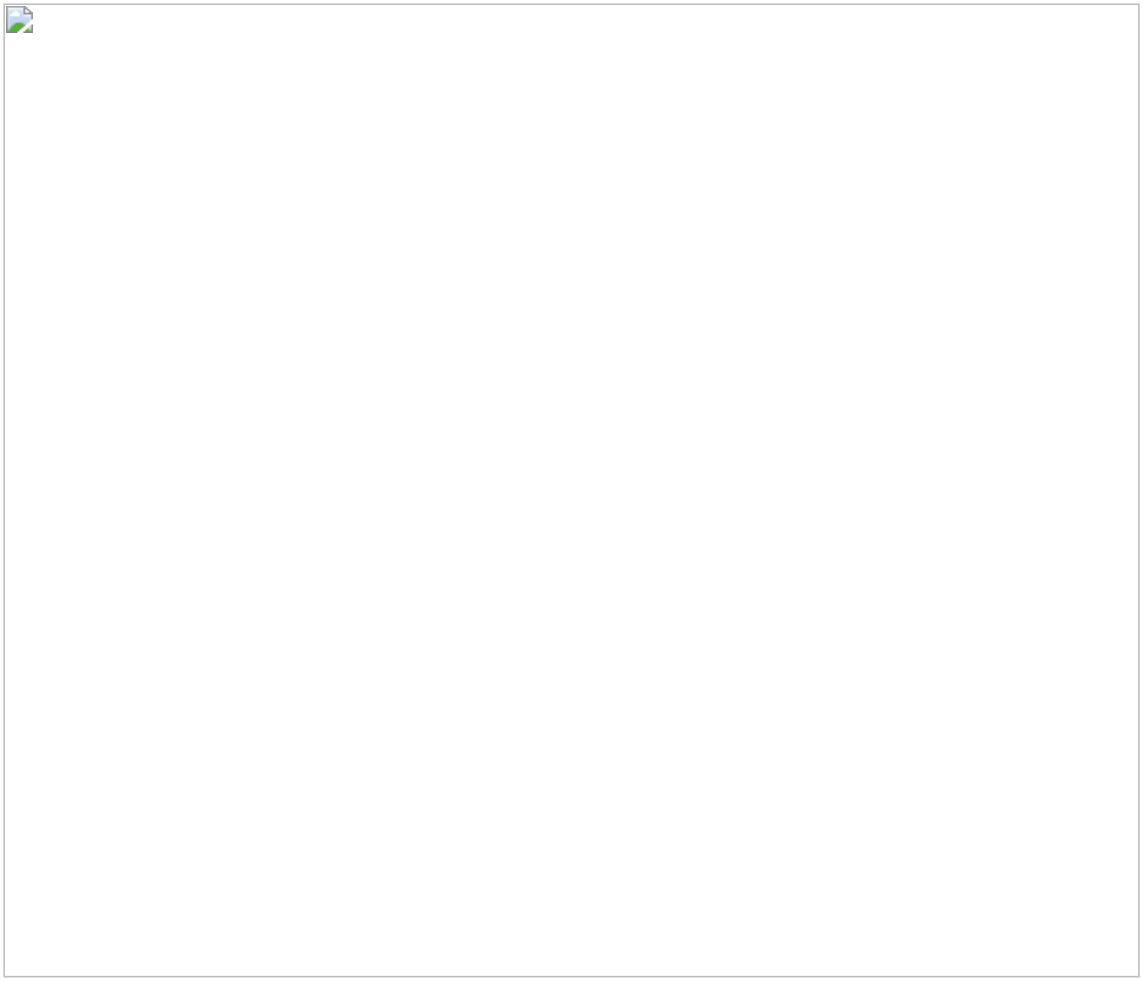
client-go under the hood

The client-go library contains various mechanisms that you can use when developing your custom controllers. These mechanisms are defined in the tools/cache folder of the library.

Here is a pictorial representation showing how the various components in the client-go library work and their interaction points with the custom controller code that you will write.



client-go components

- Reflector: A reflector, which is defined in type *Reflector* inside package *cache*, watches the Kubernetes API for the specified resource type (kind). The function in which this is done is *ListAndWatch*. The watch could be for an in-built resource or it could be for a custom resource. When the reflector receives notification about existence of new resource instance through the watch API, it gets the newly created object using the corresponding listing API and puts it in the Delta Fifo queue inside the *watchHandler* function.
- Informer: An informer defined in the base controller inside package *cache* pops objects from the Delta Fifo queue. The function in which this is done is *processLoop*. The job of this base controller is to save the object for later retrieval, and to invoke our controller passing it the object.
- Indexer: An indexer provides indexing functionality over objects. It is defined in type *Indexer* inside package *cache*. A typical indexing use-case is to create an index based on object labels. Indexer can maintain indexes based on several indexing functions. Indexer uses a thread-safe data store to store objects and their keys. There is a default function named *MetaNamespaceKeyFunc* defined in type *Store* inside package *cache* that generates an object's key as `<namespace>/<name>` combination for that object.

Custom Controller components

- Informer reference: This is the reference to the Informer instance that knows how to work with your custom resource objects. Your custom controller code needs to create the appropriate Informer.
- Indexer reference: This is the reference to the Indexer instance that knows how to work with your custom resource objects. Your custom controller code needs to create this. You will be using this reference for retrieving objects for later processing.

The base controller in client-go provides the *NewIndexerInformer* function to create Informer and Indexer. In your code you can either directly invoke this function or use factory methods for creating an informer.

- Resource Event Handlers: These are the callback functions which will be called by the Informer when it wants to deliver an object to your controller. The typical pattern to write these functions is to obtain the dispatched object's key and enqueue that key in a work queue for further processing.
- Work queue: This is the queue that you create in your controller code to decouple delivery of an object from its processing. Resource event handler functions are written to extract the delivered object's key and add that to the work queue.
- Process Item: This is the function that you create in your code which processes items from the work queue. There can be one or more other functions that do the actual processing. These functions will typically use the Indexer reference, or a Listing wrapper to retrieve the object corresponding to the key.