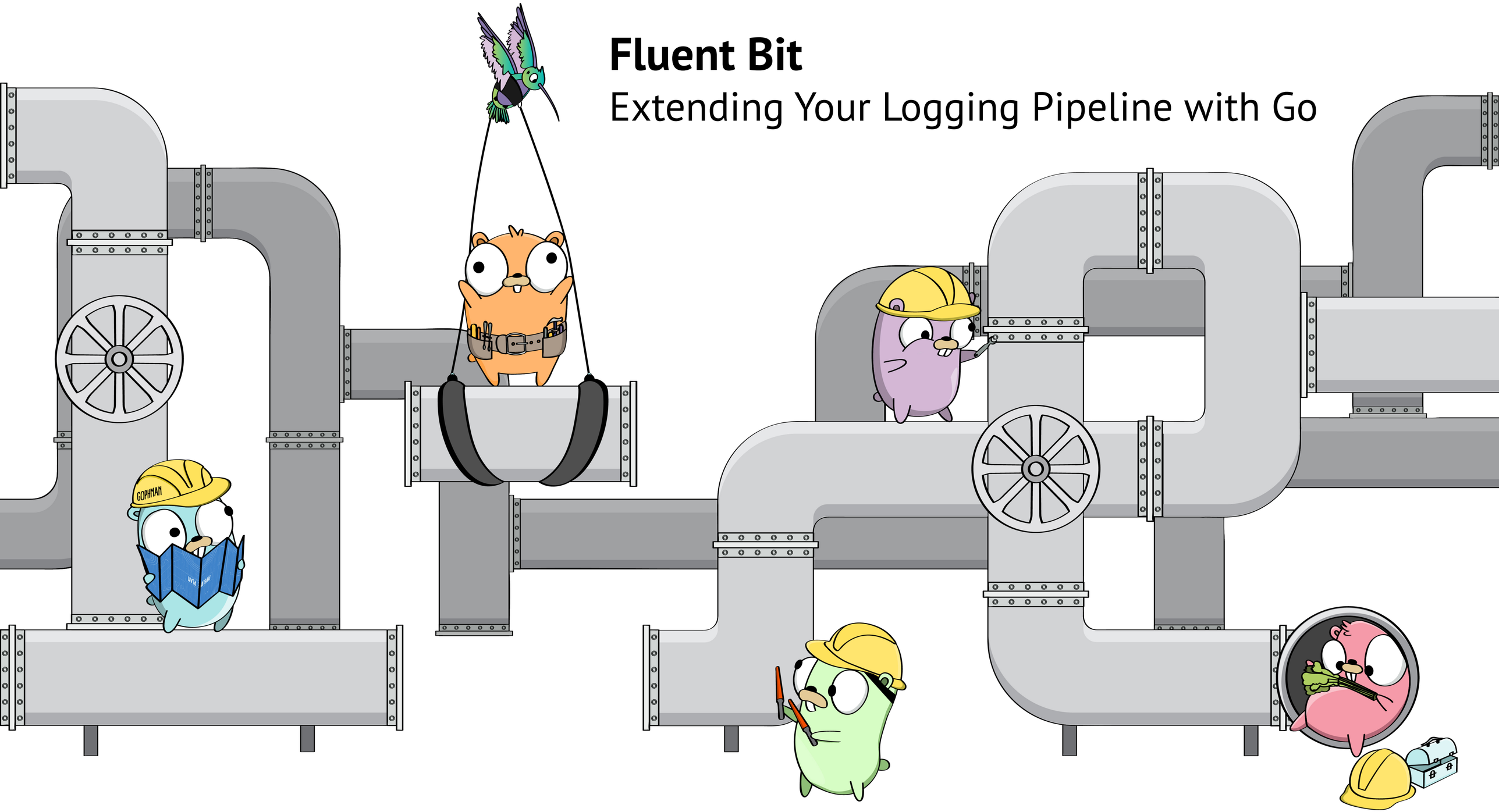
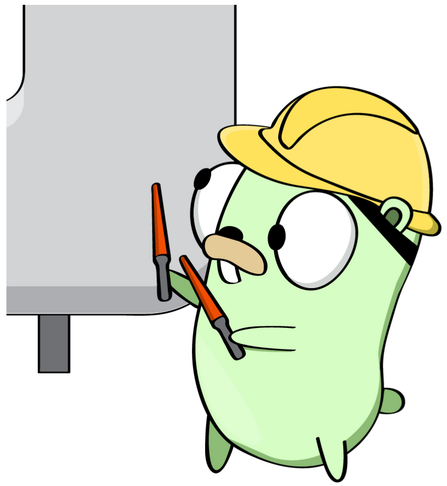
Fluent Bit

Extending Your Logging Pipeline with Go

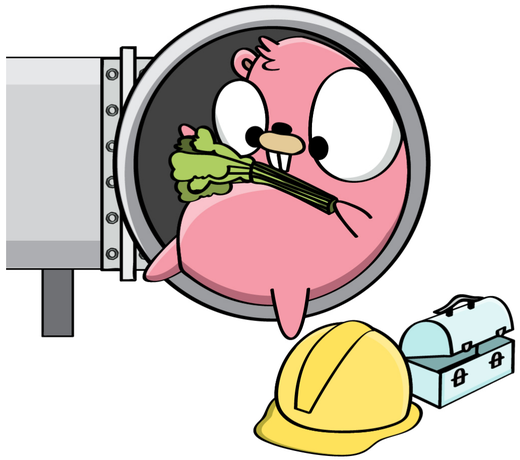


Warren Fernandes
Pivotal

Jason Keene
Pivotal



Warren Fernandes
Pivotal



Jason Keene
Pivotal

Why Architecture Go Interface Moving Forward

Why
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Moving Forward

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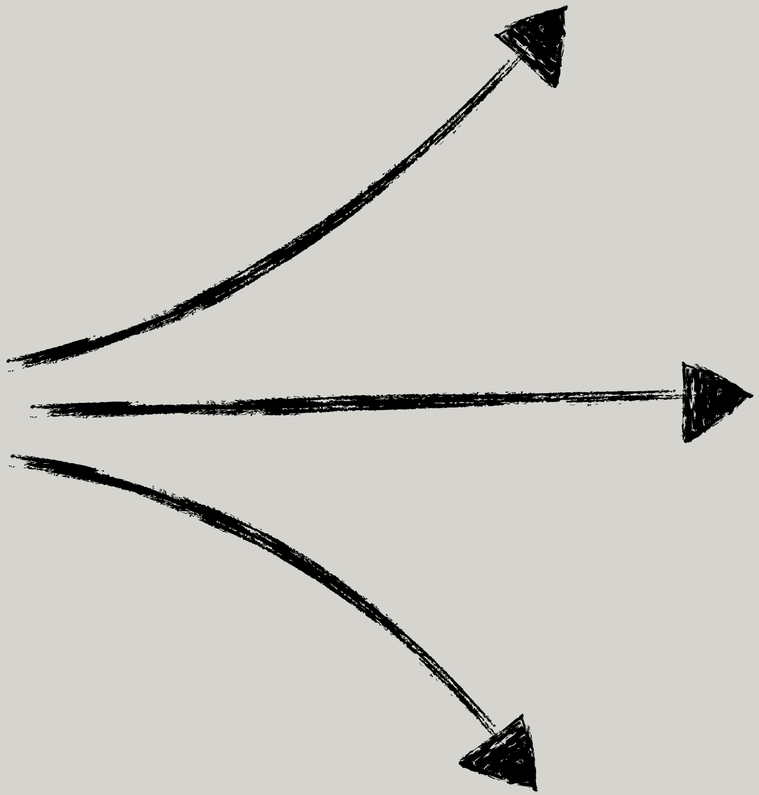
syslog



Message Reliability

was our **Primary Consideration**

CLOUD NATIVE
COMPUTING FOUNDATION

RFC 5424 Support

Resource Usage

and

Performance

fluentd

fluentbit

fluentd

Implemented in Ruby/C

Ecosystem of Plugins (900+)

Extend with Ruby

Memory Usage (40MB)

Higher CPU Usage

Better for Aggregation

Support Forward Protocol

fluentbit

Implemented in C

Plugins are Included (54)

Extend with C/Go/Lua

Reduced Memory Usage (500KB)

Lower CPU Usage

Better as an DaemonSet

Support Forward Protocol

fluentd

fluentbit

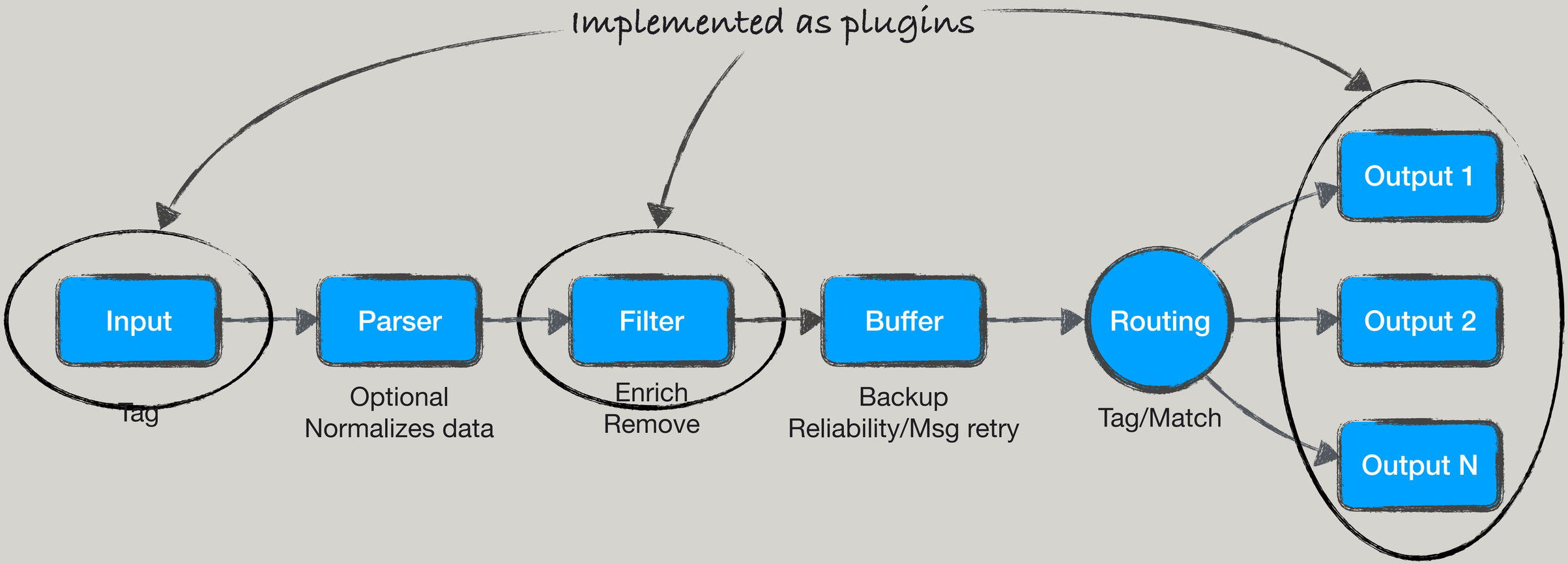
fluentd

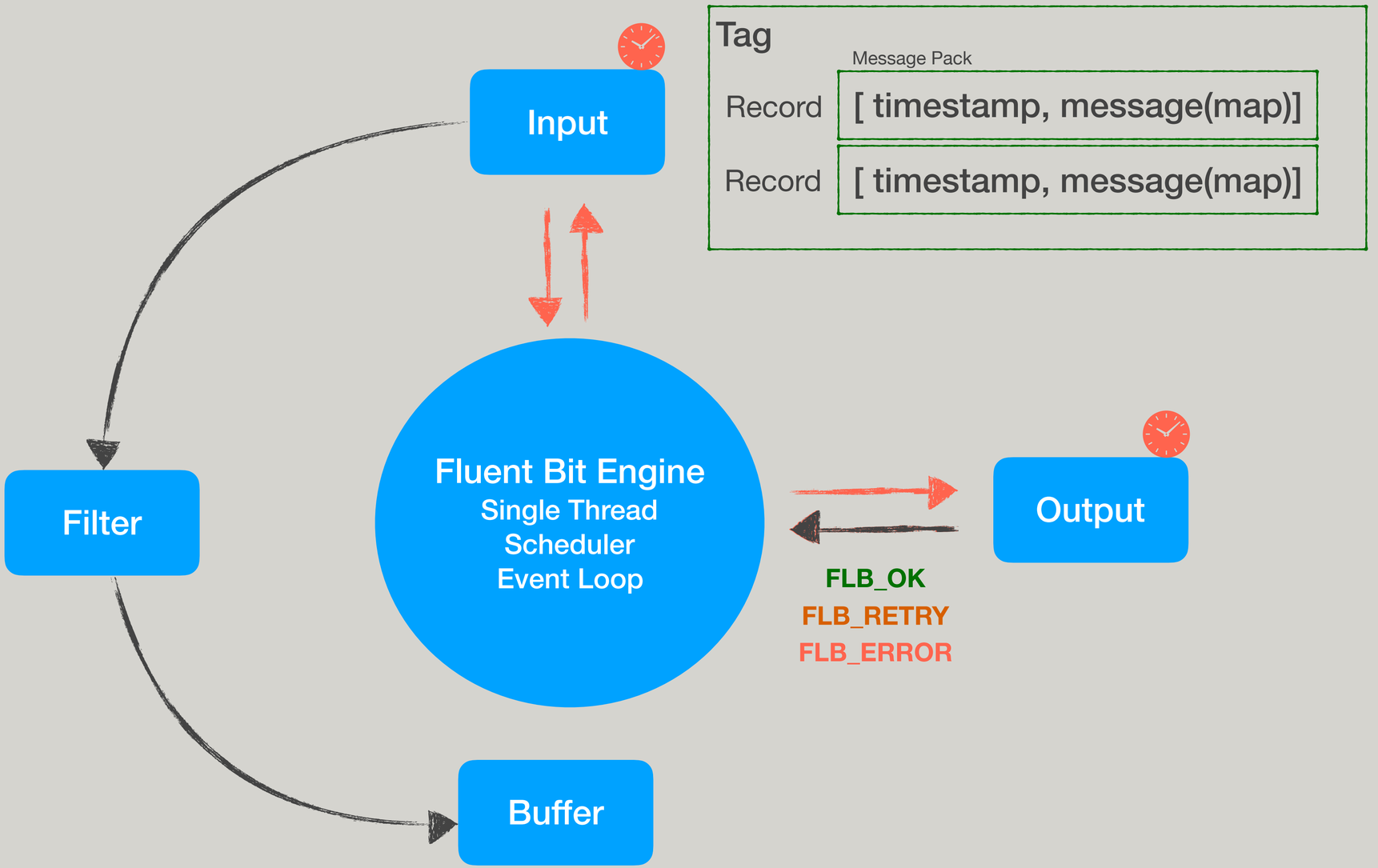
fluentbit

	fluentd	fluentbit
Message Reliability	Buffering + Retries	Buffering + Retries
Kubernetes Support	Tail/Filter	Tail/Filter
CNCF Status	Graduated	Sub-project
Go Support	Nope	Output Plugins
RFC 5424	Not Compliant	No Output
Resource Usage	Not Bad	Great
Performance	Not Bad	Great

Why
Architecture
Go Interface
Moving Forward

Eduardo Silva's Deep Dive talk at KubeCon Seattle 2018


Implemented as plugins
Input
Parser
Filter
Buffer
Routing
Output 1
Output 2
Output N
Tag
Optional
Normalizes data
Enrich
Remove
Backup
Reliability/Msg retry
Tag/Match


Tag
Message Pack
Record
[timestamp, message(map)]
Record
[timestamp, message(map)]
Input
Filter
Fluent Bit Engine
Single Thread
Scheduler
Event Loop
Output
FLB_OK
FLB_RETRY
FLB_ERROR
Buffer

Why
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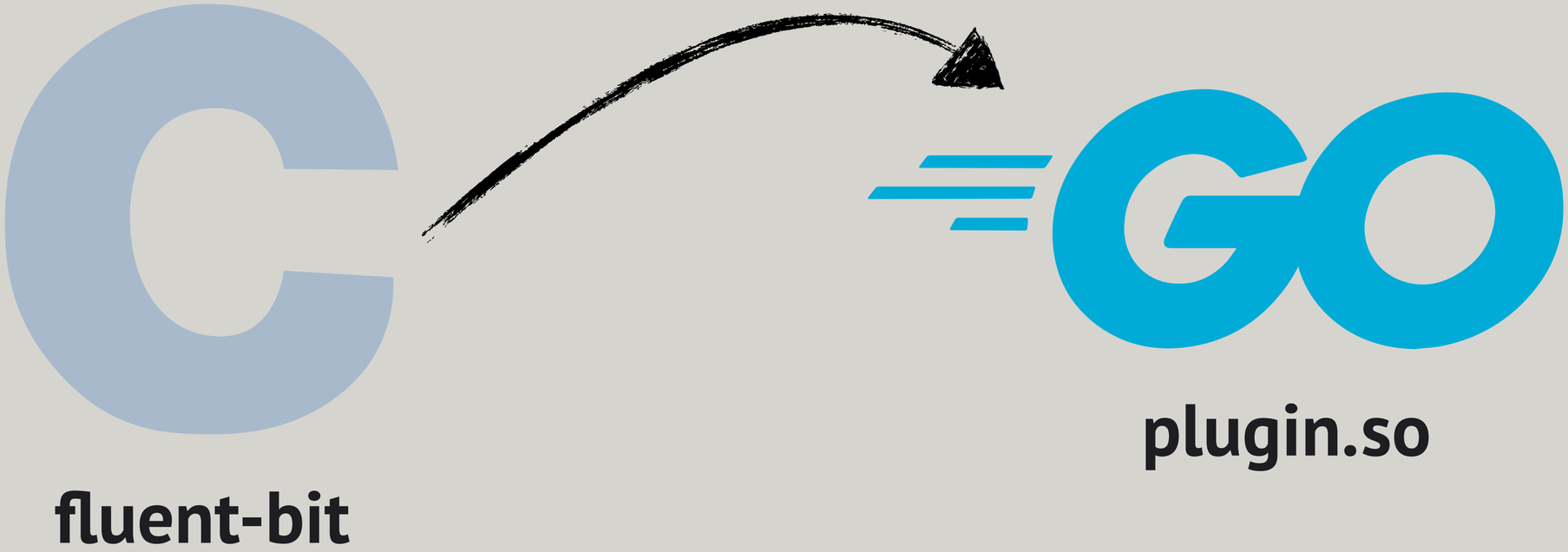
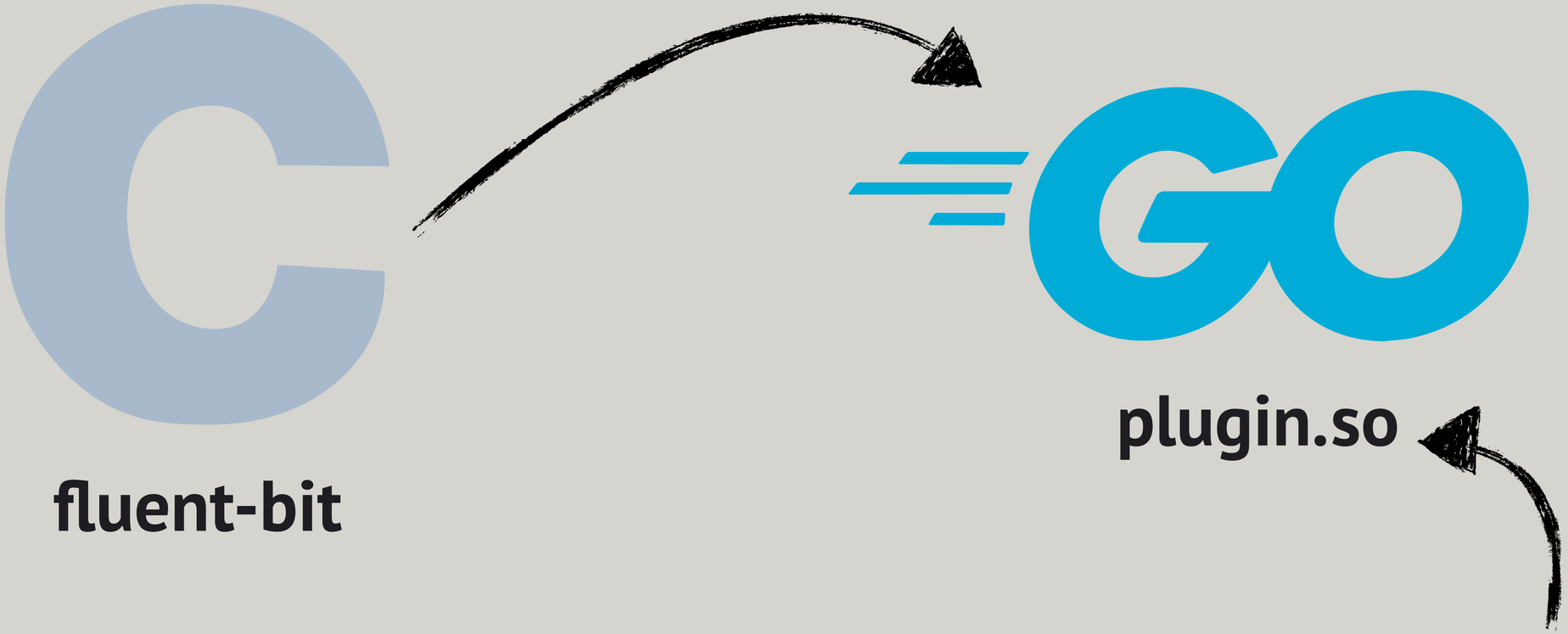
Moving Forward

How does **Fluent Bit** interface with **Go?**

dynamic linking



dynamic linking



Build Modes

```
go build -buildmode ...
```

- default
- archive
- exe
- pie
- shared
- plugin
- c-archive
- c-shared

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- **c-shared**

```go
package main

import "C"

//export MyAwesomeFunction
func MyAwesomeFunction() {
  println("You are awesome!")
}

func main() {}
```

```
$ go build -o plugin.so -buildmode c-shared
```

```
$ readelf --dyn-syms plugin.so | grep MyAwesomeFunction
    42: 0000000000095470    51 FUNC    GLOBAL DEFAULT   12 MyAwesomeFunction
```


C
GO
plugin.so
fluent-bit


C
GO
plugin.so
fluent-bit

C Types	In Go
void *	unsafe.Pointer
char *	*C.char
int	C.int
unsigned long long	C.ulonglong
__int128_t	[16]byte
struct foo	C.struct_foo
union foo	C.union_foo
enum foo	C.enum_foo

Go Types	In C
unsafe.Pointer	void *
string	GoString
[]byte	GoSlice
int	GoInt
uint64	GoUint64
complex128	GoComplex128

What about functions that return
Multiple Values?

```go
//export MultipleReturns
func MultipleReturns() (int, *int, string, []byte) {
  return 0, nil, "", nil
}
```

```c
/* Return type for MultipleReturns */
struct MultipleReturns_return {
  GoInt r0;
  GoInt* r1;
  GoString r2;
  GoSlice r3;
};
```

How do you write a **Fluent Bit Go** plugin?

```go
//export FLBPluginRegister
func FLBPluginRegister(def unsafe.Pointer) int {
  // Gets called only once when the .so is loaded.
}

//export FLBPluginInit
func FLBPluginInit(plugin unsafe.Pointer) int {
  // Gets called once for each instance you have configured.
}

//export FLBPluginFlushCtx
func FLBPluginFlushCtx(ctx, data unsafe.Pointer, length C.int, tag *C.char) int {
  // Gets called with a batch of records to be written to an instance.
}

//export FLBPluginExit
func FLBPluginExit() int {
  // Gets called on teardown.
}
```

```
//export FLBPluginRegister
func FLBPluginRegister(def unsafe.Pointer) int {
 // Gets called only once when the .so is loaded.

 return output.FLBPluginRegister(
     def, "multiinstance", "Testing multiple instances.")
}
```

```
//export FLBPluginInit
func FLBPluginInit(plugin unsafe.Pointer) int {
  // Gets called once for each instance you have configured.

  // Read configuration values.
  hostname := output.FLBPluginConfigKey(plugin, “hostname")

  // Set the context to anything.
  // This is used to know what instance to flush messages for.
  output.FLBPluginSetContext(plugin, hostname)

  // Return FLB_OK or FLB_ERROR.
  return output.FLB_OK
}
```

```go
//export FLBPluginFlushCtx
func FLBPluginFlushCtx(ctx, data unsafe.Pointer, length C.int, tag *C.char) int {
  // Gets called with a batch of records to be written to an instance.

  // Type assert context back into the original type.
  id := output.FLBPluginGetContext(ctx).(string)

  dec := output.NewDecoder(data, int(length))
  for {
    ret, _, record := output.GetRecord(dec)
    if ret != 0 {
      break
    }
    log.Printf("Flushing to hostname: %s, data: %v", hostname, record)
    // ...
  }

  // Return FLB_OK, FLB_RETRY, or FLB_ERROR.
  return output.FLB_OK
}
```

```
//export FLBPluginExit
func FLBPluginExit() int {
  // Gets called on teardown.

  // Return FLB_OK or FLB_ERROR.
  return output.FLB_OK
}
```

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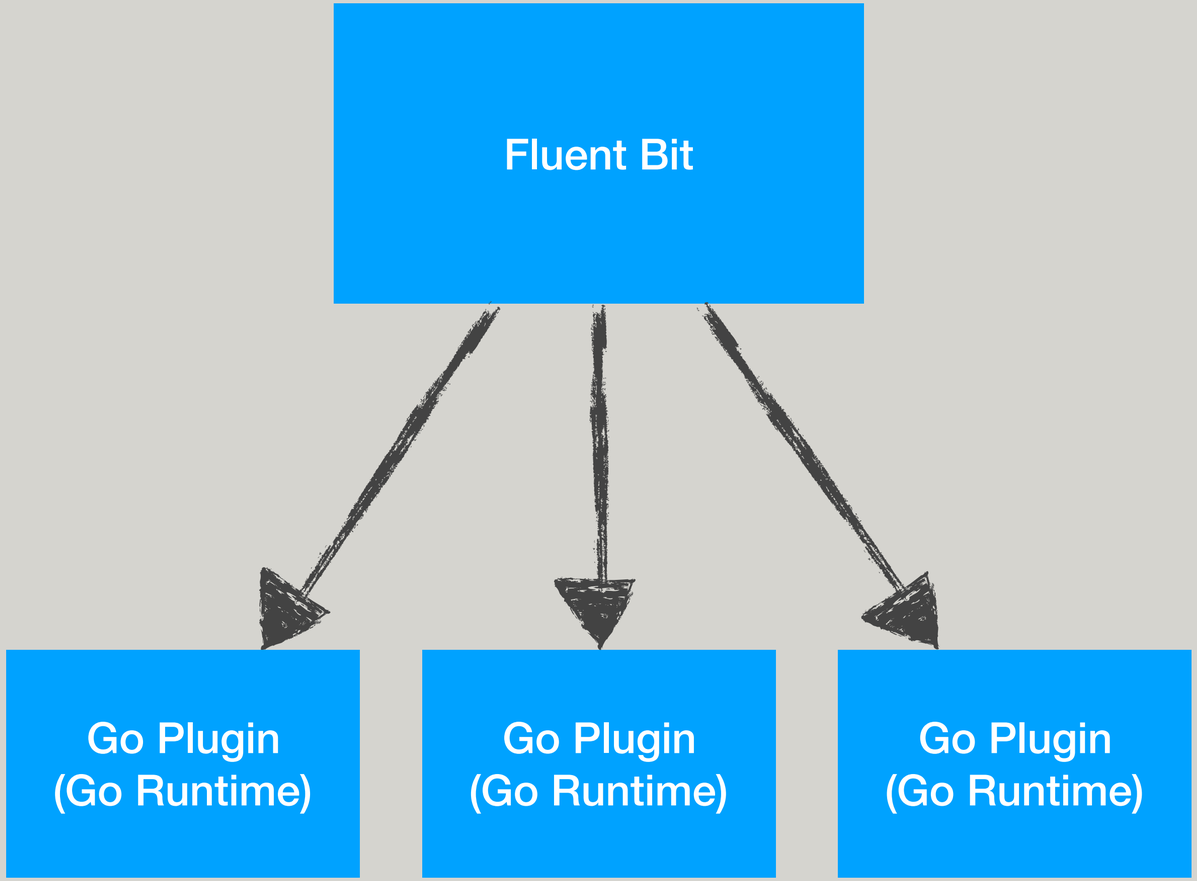
Better Support for Multiple Go Plugins



-buildmode c-shared

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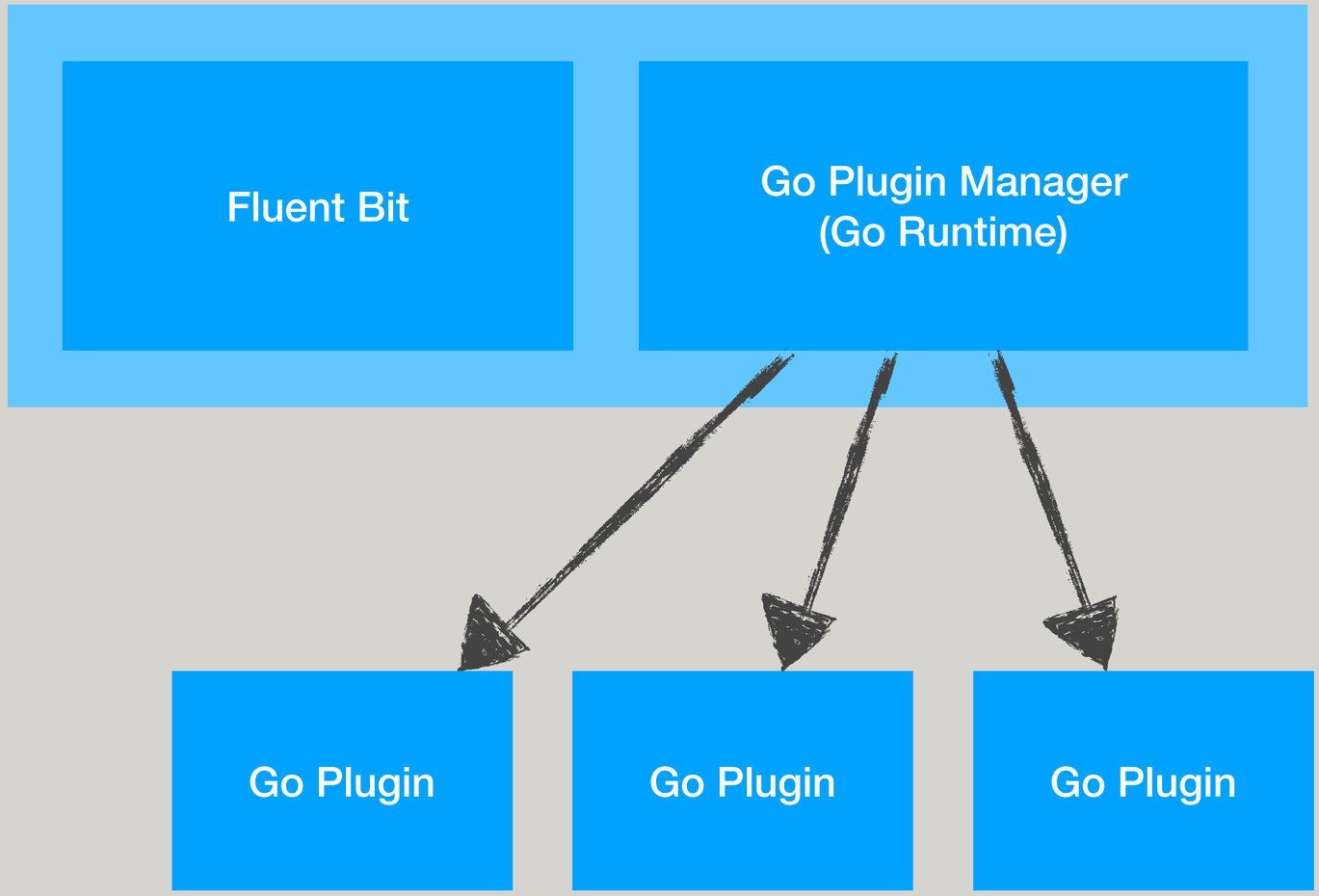
- c-shared



-buildmode c-archive

-buildmode plugin

Establish a Versioned ABI

Input and Filter plugins in Go

Expose logging and metrics for Go plugins

github.com/fluent/fluent-bit-go

Thanks!

Questions?