A simple way to migrate configuration files

or rather, non-bloat configuration tool

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Challenges

- non-incremental upgrades: from version 1.x to 4.x
- structural changes: block changes

Idea

- using reflection
- recursive walk
- building a migration path

Should We Migrate?

- Retrieve the current document version

```
var objmap map[string]*json.RawMessage
json.Unmarshal(config, &objmap); err != nil {
v := "" // Current document version
json.Unmarshal(*objmap["ConfigVersion"], &v)
```

The Interface

```
type Configuration interface {
    Version() string
    Migrations() []string
    Migrate(from Configuration) error
    Depends() string
}
```

- every possible configuration

```
Configs = make(map[string]Configuration)
```

We Need Rules

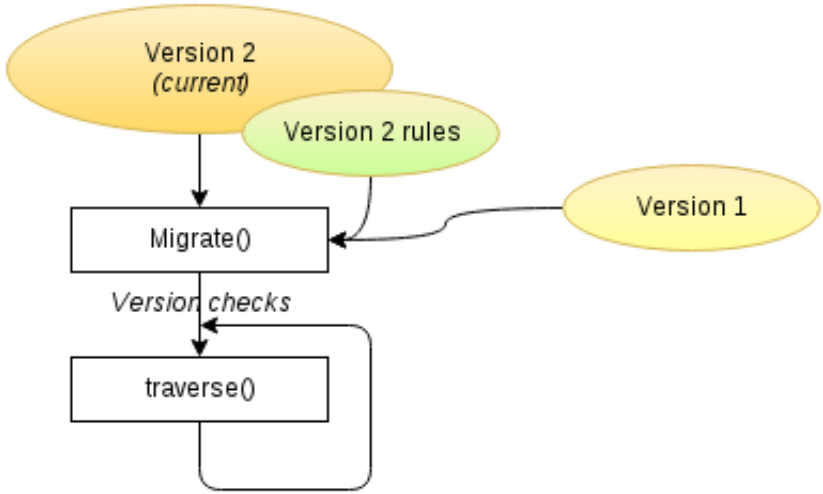
- A function that accepts a value that is being migrated and returns an error if the migration couldn't be done

```
type MigrationRule func(value reflect.Value) error
```

- rules are provided by target

```
rules map[string]MigrationRule
```

- what we now have



Traversing And Rules

- run handler if we hit a rule
- otherwise, copy values

```
func traverse(src, dest) {
    switch src.Kind() {
    case reflect.Ptr:
    // dereference pointers
    fallthrough
    case reflect.Struct
        if rule, ok := rules[srcName]; ok { // apply rule to whole struct
            err := rule(src)
        } else { // traverse elements
            traverse(...
        }
    default:
        // find value in target
        value := findField(srcName, srcType, dest)
        value.Set(src)
}
```

Traversing And Rules - a problem

- values can have same name and same type

```
type CfgV1 struct {
    Clients []struct {
        Host string
    }
    Host string
}
type CfgV2 struct {
    Host string
}
```

- shows up as a problem in previous attempts to traverse
- keep a map of already migrated values (map[parent]values)

Build Migration Path

- We want a sequence of migration we need to perform to get from version A to C

```
sequence := []Configuration{}
```

- Go from target downwards to the minimum dependency that is required to migrate

```
for depends := Configs[target.Depends()]; depends != nil; {
    if len(depends.Depends()) > 0 {
        sequence = append([]Configuration{depends}, sequence...)
    }
    target = depends
    depends = Configs[target.Depends()]
}
```

Migrate!

- migrate from A to C

```
oldConfig := source // current configuration
for i, _ = range sequence {
    // Inremental upgrade
    if err = sequence[i].Migrate(oldConfig); err != nil {
        return err
    }
    oldConfig = sequence[i]
}
```

- the sequence is A->B, B->C

Thanks!

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Thank you

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