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Workspace Recipes

The Workspace classes are in the [geoscript.workspace](#) package.

A Workspace is a collection of Layers. You can create, add, remove, and get Layers. There are many different kinds of Workspaces in GeoScript including Memory, PostGIS, Directory (for Shapefiles), GeoPackage, and many more.

Using Workspaces

Create a Workspace

```
Workspace workspace = new Workspace()
```

Create a Layer

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
)  
Layer layer = workspace.create(schema)  
println layer
```

```
cities
```

Check whether a Workspace has a Layer by name

```
boolean hasCities = workspace.has("cities")  
println hasCities
```

```
true
```

Get a Layer from a Workspace

```
Layer citiesLayer = workspace.get('cities')  
println citiesLayer
```

```
cities
```

Add a Layer to a Workspace

```
Schema statesSchema = new Schema("states", [  
    new Field("geom", "Polygon", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Layer statesLayer = new Layer("states", statesSchema)  
workspace.add(statesLayer)  
println workspace.has("states")
```

true

Get the names of all Layers in a Workspace

```
List<String> names = workspace.names  
names.each { String name ->  
    println name  
}
```

Directory of spatial files (shapefiles)
MySQL (JNDI)
PostGIS
PostGIS (JNDI)
Properties
Shapefile
H2 (JNDI)
H2
SQLite
MySQL
Spatialite (JNDI)
Geobuf
GeoPackage
Web Feature Server (NG)

Remove a Layer from a Workspace

```
workspace.remove("cities")  
println workspace.has('cities')
```

false

Close the Workspace when you are done

```
workspace.close()
```

Creating an in Memory Workspace

The empty Workspace constructor creates an in Memory Workspace. You can create a Layer by passing a name and a list of Fields. You can then remove the Layer by passing a reference to the Layer.

```
Workspace workspace = new Workspace()

Layer layer = workspace.create("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
println layer

workspace.remove(layer)
println workspace.has(layer.name)
```

```
cities
false
```

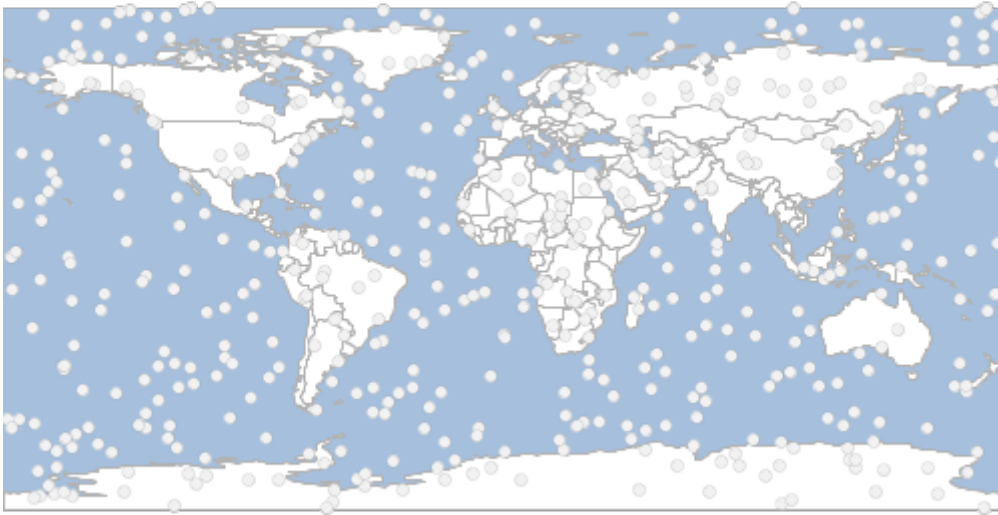
Add Layer's Features in Chunks

When adding a large Layer to a Workspace, you can add Features in chunks.

```
Workspace workspace = new Memory()
Layer layer = workspace.create("points", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer")
])
Bounds bounds = new Bounds(-180,-90, 180,90, "EPSG:4326")
Geometry.createRandomPoints(bounds.geometry, 500).geometries.eachWithIndex { Geometry
geom, int i ->
    layer.add([geom: geom, id: i])
}
println "Original Layer has ${layer.count} features."

Layer copyOfLayer = workspace.add(layer, "random points", 100)
println "Copied Layer has ${copyOfLayer.count} features."
```

```
Original Layer has 500 features.
Copied Layer has 500 features.
```



Using a Directory Workspace

A Directory Workspace is a directory of Shapefiles.

Create a Directory Workspace

```
Directory directory = new Directory("src/main/resources/data")
println directory.toString()
```

```
Directory[/home/travis/build/jericks/geoscript-groovy-
cookbook/src/main/resources/data]
```

View the Workspace's format

```
String format = directory.format
println format
```

```
Directory
```

View the Workspace's File

```
File file = directory.file
println file
```

```
/home/travis/build/jericks/geoscript-groovy-cookbook/src/main/resources/data
```

View the Workspace's list of Layer names

```
List names = directory.names
names.each { String name ->
    println name
}
```

states

Get a Layer by name

```
Layer layer = directory.get("states")
int count = layer.count
println "Layer ${layer.name} has ${count} Features."
```

Layer states has 49 Features.

Close the Directory when done.

```
directory.close()
```

Investigating Workspaces

Get available Workspace names

```
List<String> names = Workspace.getWorkspaceNames()
names.each { String name ->
    println name
}
```

Directory of spatial files (shapefiles)
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Web Feature Server (NG)

```
List<Map> parameters = Workspace.getWorkspaceParameters("GeoPackage")
parameters.each { Map param ->
    println "Parameter = ${param.key} Type = ${param.type} Required?
    ${param.required}"
}
```

```
Parameter = dbtype Type = java.lang.String Required? true
Parameter = database Type = java.io.File Required? true
Parameter = passwd Type = java.lang.String Required? false
Parameter = namespace Type = java.lang.String Required? false
Parameter = Expose primary keys Type = java.lang.Boolean Required? false
Parameter = fetch size Type = java.lang.Integer Required? false
Parameter = Batch insert size Type = java.lang.Integer Required? false
Parameter = Primary key metadata table Type = java.lang.String Required? false
Parameter = Session startup SQL Type = java.lang.String Required? false
Parameter = Session close-up SQL Type = java.lang.String Required? false
Parameter = Callback factory Type = java.lang.String Required? false
```

Creating Workspaces

Creating a Workspace from a connection string

You can create a Workspace from a connection string that contains parameters in key=value format with optional single quotes.

Create a Shapefile Workspace

```
String connectionString = "url='states.shp' 'create spatial index'=true"
Workspace workspace = Workspace.getWorkspace(connectionString)
```

Create a GeoPackage Workspace

```
connectionString = "dbtype=geopkg database=layers.gpkg"
workspace = Workspace.getWorkspace(connectionString)
```

Create a H2 Workspace

```
connectionString = "dbtype=h2 database=layers.db"
workspace = Workspace.getWorkspace(connectionString)
```

You can use the `withWorkspace` method to automatically handle closing the `Workspace`.

```
Workspace.withWorkspace("dbtype=geopkg database=src/main/resources/data.gpkg") {  
  Workspace workspace ->  
    println workspace.format  
    println "-----"  
    workspace.names.each { String name ->  
      println "${name} (${workspace.get(name).count})"  
    }  
}
```

```
GeoPackage  
-----  
countries (177)  
ocean (2)  
places (326)  
rivers (460)  
states (52)
```

Creating a Workspace from a connection map

You can create a `Workspace` from a connection map that contains parameters.

Create a H2 Workspace

```
Map params = [dbtype: 'h2', database: 'test.db']  
Workspace workspace = Workspace.getWorkspace(params)
```

Create a PostGIS Workspace

```
params = [  
  dbtype: 'postgis',  
  database: 'postgres',  
  host: 'localhost',  
  port: 5432,  
  user: 'postgres',  
  passwd: 'postgres'  
]  
workspace = Workspace.getWorkspace(params)
```

Create a GeoBuf Workspace

```
params = [file: 'layers.pbf', precision: 6, dimension: 2]  
workspace = Workspace.getWorkspace(params)
```


You can use the `withWorkspace` method to automatically handle closing the `Workspace`.

```
Workspace.withWorkspace([dbtype: 'geopkg', database: 'src/main/resources/data.gpkg'])
{ Workspace workspace ->
  println workspace.format
  println "-----"
  workspace.names.each { String name ->
    println "${name} (${workspace.get(name).count})"
  }
}
```

```
GeoPackage
-----
countries (177)
ocean (2)
places (326)
rivers (460)
states (52)
```

Creating Directory Workspaces

Create a *Directory Workspace* from a directory name

```
Workspace workspace = new Directory("src/main/resources/shapefiles")
println workspace.format
println "-----"
workspace.names.each { String name ->
  println "${name} (${workspace.get(name).count})"
}
```

```
Directory
-----
ocean (2)
countries (177)
```

Create a *Directory Workspace* from a *File* directory

```
Workspace workspace = new Directory(new File("src/main/resources/shapefiles"))
println workspace.format
println "-----"
workspace.names.each { String name ->
  println "${name} (${workspace.get(name).count})"
}
```

Directory

ocean (2)

countries (177)

Create a Directory Workspace from a URL

```
Directory directory = Directory.fromURL(  
    new URL  
    ("http://www.naturalearthdata.com/http://www.naturalearthdata.com/download/110m/cultural/ne_110m_admin_0_countries.zip"),  
    new File("naturalearth")  
)  
println directory.format  
println "-----"  
directory.names.each { String name ->  
    println "${name} (${directory.get(name).count})"  
}
```

Directory

ne_110m_admin_0_countries (177)

Creating GeoPackage Workspaces

Create a GeoPackage Workspace from a file name

```
Workspace workspace = new GeoPackage("src/main/resources/data.gpkg")  
println workspace.format  
println "-----"  
workspace.names.each { String name ->  
    println "${name} (${workspace.get(name).count})"  
}
```

GeoPackage

countries (177)

ocean (2)

places (326)

rivers (460)

states (52)

Create a GeoPackage Workspace from a File

```
Workspace workspace = new GeoPackage(new File("src/main/resources/data.gpkg"))
println workspace.format
println "-----"
workspace.names.each { String name ->
    println "${name} (${workspace.get(name).count})"
}
```

```
GeoPackage
-----
countries (177)
ocean (2)
places (326)
rivers (460)
states (52)
```

Creating H2 Workspaces

Create a H2 Workspace from a File

```
Workspace workspace = new H2(new File("src/main/resources/h2/data.db"))
println workspace.format
println "--"
workspace.names.each { String name ->
    println "${name} (${workspace.get(name).count})"
}
```

```
H2
--
countries (177)
ocean (2)
places (326)
states (52)
```

Creating Geobuf Workspaces

Create a Geobuf Workspace from a File

```
Workspace workspace = new Geobuf(new File("src/main/resources/geobuf"))
println workspace.format
println "-----"
workspace.names.each { String name ->
    println "${name} (${workspace.get(name).count})"
}
```

```
Geobuf
-----
ocean (2)
places (326)
countries (177)
```

Creating Property Workspaces

Create a Property Workspace from a File

```
Workspace workspace = new Property(new File("src/main/resources/property"))
println workspace.format
println "-----"
workspace.names.each { String name ->
    println "${name} (${workspace.get(name).count})"
}
```

```
Property
-----
circles (10)
places (10)
```

Creating PostGIS Workspaces

Create a PostGIS Workspace with basic parameters

```
PostGIS postgis = new PostGIS(
    "database",    ①
    "localhost",   ②
    "5432",        ③
    "public",      ④
    "user",        ⑤
    "password"     ⑥
)
```

- ① Database name
- ② Host name
- ③ Port
- ④ Schema
- ⑤ User name
- ⑥ Password

Create a PostGIS Workspace with advanced parameters

```
PostGIS postgis = new PostGIS(  
    "database",           ①  
    "localhost",         ②  
    "5432",              ③  
    "public",            ④  
    "user",              ⑤  
    "password",          ⑥  
    true,               ⑦  
    true,               ⑧  
    "OWNER geo TABLESPACE points" ⑨  
)
```

- ① Database name
- ② Host name
- ③ Port
- ④ Schema
- ⑤ User name
- ⑥ Password
- ⑦ Estimated Extent
- ⑧ Create Database
- ⑨ Create Database Params

Create a PostGIS Workspace with named parameters. Only the database name is required.

```
PostGIS postgis = new PostGIS("database",  
    "host": "localhost",  
    "port": "5432",  
    "schema": "public",  
    "user": "user",  
    "password": "secret",  
    "estimatedExtent": false,  
    "createDatabase": false,  
    "createDatabaseParams": "OWNER geo TABLESPACE points"  
)
```