API specification

The two main server components are the ‘Indicator Generator’ (developed by K&A) and the ‘Indicator Presenter’ (developed by WCMC), both of which are visible in the system diagram. This project depends on them working together efficiently.

The API delivered by K&A should match the examples given below. We’ll develop automated testing process to validate the output from the Esri APIs for each indicator.

JSON API

Index

Path: `/indicators`
Type: `GET`
Description: A list of all the indicators which the service provides, containing the name and id of the each.
Example 1:

```
GET /indicators
[
  {
    "id": 1,
    "name": "Protected Area Cover"
  },
  {
    "id": 2,
    "name": "Percentage of Threatened Species"
  }
]
```

Example 2:

```
GET /indicators
[
```

```
  {
    "id": 2,
    "name": "Percentage of Threatened Species"
  },
  {
    "id": 5,
    "name": "Arable and Permanent Crop Land Area"
  },
  {
    "id": 6,
    "name": "Annual Fish Catch"
  }
]
```

Indicator metadata

Path: `/indicator/:id`

Description: Provides a description of the indicator. This includes a list of the fields indicator provide. It is based on a typical Esri JSON metadata route: http://maps.esri.com/apl4/sdk/rest/layer.html This route will be used be WCMC to configure our requests to the indicator data query route, our visualisations of indicators and the style and extent of the WMS-backed maps.

Example 2:

```
GET /indicators/1
{
  "id" : 1,
  "name" : "Protected Area Cover",
  "description" : "Protected area cover in Abu Dhabi",
  "fields" : [
    {
      "name" : "OBJECTID",
```

```
      "type" : "esriFieldTypeOID"},
    {
      "name" : "Shape",
      "type" : "esriFieldTypeGeometry"},
    {
      "name" : "Year",
      "type" : "esriFieldTypeInteger",
      "unit" : "year"},
    {
      "name" : "Cover",
      "type" : "esriFieldTypeDouble",
      "unit" : "percentage"}
  ],
  "capabilities" : "Map,Query,Data",
  "extent" : {
    "xmin" : -158.204086303711,
    "ymin" : 19.0670623779298,
    "xmax" : -67.0972431225637,
    "ymax" : 70.3192330240338,
    "spatialReference" : {
      "wkid" : 4326
    }
  },
  "drawingInfo" : {"renderer" :
    {
      "type" : "simple",
      "symbol" :
      {
        "type" : "esriSLS",
        "style" : "esriSLSSolid",
```

```
        "color" : [
          250,
          52,
          17,
          255
        ],
        "width" : 1.7
      },
      "label" : "",
      "description" : ""
    },
    "transparency" : 0,
    "labelingInfo" : null}
}
```

Example 2:

```
GET /indicators/2
{
  "id" : 2,
  "name" : "Arable and Permanent Crop Land Area",
  "type" : "Feature Layer",
  "description" : "Arable and Permanent Crop Land Area",
  "fields" : [
    {
      "name" : "OBJECTID",
      "type" : "esriFieldTypeOID"},
    {
      "name" : "Shape",
      "type" : "esriFieldTypeGeometry"},
    {
```

```
      "name" : "Year",
      "type" : "esriFieldTypeInteger",
      "unit" : "year"},
    {
      "name" : "Area",
      "type" : "esriFieldTypeDouble",
      "unit" : "KM2"}
  ],
  "capabilities" : "Map,Query,Data",
  "extent" : {
    "xmin" : -158.204086303711,
    "ymin" : 19.0670623779298,
    "xmax" : -67.0972431225637,
    "ymax" : 70.3192330240338,
    "spatialReference" : {
      "wkid" : 4326
    }
  },
  "drawingInfo" : {"renderer" :
    {
      "type" : "simple",
      "symbol" :
      {
        "type" : "esriSLS",
        "style" : "esriSLSSolid",
        "color" : [
          4,
          177,
          50,
          140
```

```
        ],
        "width" : 1.0
      },
      "label" : "",
      "description" : ""
    },
    "transparency" : 0,
    "labelingInfo" : null}
}
```

Indicator Data query

Path: `/indicators/:id/query`
Type: `GET`
Description: Returns indicator data, based on the given parameters. Based on http://maps.esri.com/apl4/sdk/rest/query.html, it will be expected to be able to provide the typical Esri query options, e.g.:
http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Petroleum/KGS_OilGasFields_Kansas/MapServer/0/query
In particular:

- *?where=* Specify an SQL-like WHERE clause to filter data based on its field value (see example 2)
- *?returnGeometry=* Boolean, specify is geometry is returned. The geometry returned should be in 900913 projection, ready for putting onto web maps
- *?outFields=* Comma-separated list of fields to return
- *?returnCountOnly=* Boolean, only return count of features
- *?returnIdsOnly=* Boolean, only return feature IDs

Example 1:
Selecting Year and Percentage fields with no filters

```
GET /indicators/1/query?returnGeometry=false&outFields=Year,Percentage
{
  "fields" : [
```

```
    {
      "name" : "Percentage",
      "type" : "esriFieldTypeDouble",
      "unit" : "percentage"
    },
    {
      "name" : "Year",
      "type" : "esriFieldTypeString",
      "unit" : "year"
    }
  ],
  "features" : [
    {
      "attributes" : {
        "Percentage" : 28,
        "Year" : 2010
      }
    },
    {
      "attributes" : {
        "Percentage" : 26,
        "Year" : 2011
      }
    },
    {
      "attributes" : {
        "Percentage" : 32,
        "Year" : 2012
      }
    }
```

```
  ]
}
```

Example 2:

Select Year and Area with a ‘where’ clause filtering out years before 2010

```
GET /indicators/2/query?returnGeometry=false&outFields=Year,Area&where=Year+>+2009
{
  "fields" : [
    {
      "name" : "Year",
      "type" : "esriFieldTypeInteger",
      "unit" : "year"},
    {
      "name" : "Area",
      "type" : "esriFieldTypeDouble",
      "unit" : "KM2"}
  ],
  "features" : [
    {
      "attributes" : {
        "Area" : 64,
        "Year" : 2010
      }
    },
    {
      "attributes" : {
        "Area" : 59,
        "Year" : 2011
      }
    },
    {
```

```
      "attributes" : {
        "Area" : 70,
        "Year" : 2012
      }
    }
  ]
}
```


Example 3:

As above, with geometry

```
GET /indicators/2/query?returnGeometry=true&outFields=Year,Area&where=Year+>+2009
```


```
{
  "fields" : [
    {
      "name" : "Year",
      "type" : "esriFieldTypeInteger",
      "unit" : "year"},
    {
      "name" : "Area",
      "type" : "esriFieldTypeDouble",
      "unit" : "KM2"}
  ],
  "features" : [
    {
      "attributes" : {
        "Area" : 64,
        "Year" : 2010
      },
      "geometry" : {
        "rings" : [
          [
```

```
            [
              -95.167626617695234,
              37.950547641329919
            ],
            [
              -95.169891246662928,
              37.950542423238204
            ],
            [
              -95.169915335934562,
              37.952356249300038
            ]
          ]
        ]
      }
    },
    {
      "attributes" : {
        "Area" : 59,
        "Year" : 2011
      },
      "geometry" : {
        "rings" : [
          [
            [
              -98.928689953838969,
              37.098482709734824
            ],
            [
              -98.928696904388701,
```

```
              37.096669394184048
            ],
            [
              -98.928697024982881,
              37.096635150668263
            ]
          ]
        ]
      }
    },
    {
      "attributes" : {
        "Area" : 70,
        "Year" : 2012
      },
      "geometry" : {
        "rings" : [
          [
            [
              -98.928675719936763,
              37.10218922851552
            ],
            [
              -98.928682628421498,
              37.100386221231638
            ],
            [
              -98.928682848414894,
              37.100334081400455
            ]
```

```
            ]
          ]
        }
      }
    ]
}
```

WMS service

Each indicator layer will also provide a WMS service, to allow us to integrate the maps into the SOER client applications. As we will be displaying these maps on the web, we will expect the data to be projected to 900913 (the standard used by Google Maps). GetFeatureInfo and GetLegendGraphic should be enabled for each indicator, so we can allow the user to query points and display legends if necessary.
WCMC will expect to be able do filtering on the tiles of these layers using custom SLDs with the filters used here:
http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#//005300000049000000.htm

Examples:

This request should return a PNG map tile for the given indicator and bounding box
http://<SOER-Indicator-address>/indicator/1/MapServer/WMSServer?service=WMS&request=GetMap&version=1.1.1&layers=1&styles=&format=image/png&transparent=true&height=256&width=256&srs=EPSG:900913&bbox=-10644926.307106785,3757032.814272983,-10018754.171394622,4383204.949985145

This request should return a PNG map tile for the given indicator and bounding box, reading an SLD served by WCMC to filter/style the tile:
http://<SOER-Indicator-address>/indicator/3/MapServer/WMSServer?service=WMS&request=GetMap&version=1.1.1&layers=1&styles=,,newerThan2010&format=image/png&transparent=true&height=256&width=256&srs=EPSG:900913&bbox=-10644926.307106785,3757032.814272983,-10018754.171394622,4383204.949985145&SLD=http://<WCMC-Style-Server>/filterNewerThan2010.xml